KONICA MINOLTA

SERVICE MANUAL

THEORY OF OPERATION

bizhub C250 / C252

This Service Manual is designed for machine with Firmware Card Ver. G4 and onward.

2006.08

KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 3.0

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SAFETY AND IMPORTANT WARNING ITEMS

Read carefully the Safety and Important Warning Items described below to understand them before doing service work.

IMPORTANT NOTICE

Because of possible hazards to an inexperienced person servicing this product as well as the risk of damage to the product, KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. (hereafter called the KMBT) strongly recommends that all servicing be performed only by KMBT-trained service technicians.
Changes may have been made to this product to improve its performance after this Service Manual was printed. Accordingly, KMBT does not warrant, either explicitly or implicitly, that the information contained in this Service Manual is complete and accurate.
The user of this Service Manual must assume all risks of personal injury and/or damage to the product while servicing the product for which this Service Manual is intended.
Therefore, this Service Manual must be carefully read before doing service work both in the course of technical training and even after that, for performing maintenance and control of the product properly.
Keep this Service Manual also for future service.

DESCRIPTION ITEMS FOR DANGER, WARNING AND CAUTION

In this Service Manual, each of three expressions "⚠ DANGER", "⚠ WARNING", and "⚠ CAUTION" is defined as follows together with a symbol mark to be used in a limited meaning.
When servicing the product, the relevant works (disassembling, reassembling, adjustment, repair, maintenance, etc.) need to be conducted with utmost care.

⚠ **DANGER: Action having a high possibility of suffering death or serious injury**

⚠ **WARNING: Action having a possibility of suffering death or serious injury**

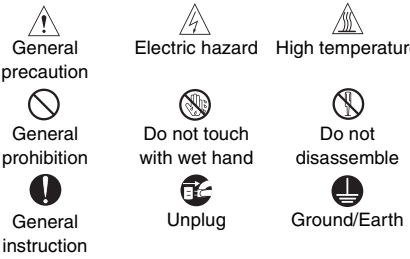
⚠ **CAUTION: Action having a possibility of suffering a slight wound, medium trouble, and property damage**

Symbols used for safety and important warning items are defined as follows:

△ :Precaution when servicing the product.

⃠ :Prohibition when servicing the product.

● :Direction when servicing the product.



SAFETY WARNINGS

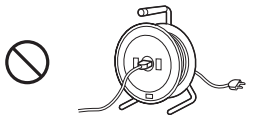
[1] MODIFICATIONS NOT AUTHORIZED BY KONICA MINOLTA BUSINESS TECHNOLOGIES, INC.

KONICA MINOLTA brand products are renowned for their high reliability. This reliability is achieved through high-quality design and a solid service network.
Product design is a highly complicated and delicate process where numerous mechanical, physical, and electrical aspects have to be taken into consideration, with the aim of arriving at proper tolerances and safety factors. For this reason, unauthorized modifications involve a high risk of degradation in performance and safety. Such modifications are therefore strictly prohibited. the points listed below are not exhaustive, but they illustrate the reasoning behind this policy.

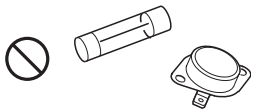
Prohibited Actions

⚠ DANGER

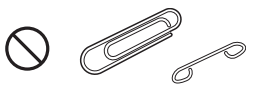
- Using any cables or power cord not specified by KMBT.



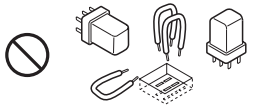
- Using any fuse or thermostat not specified by KMBT. Safety will not be assured, leading to a risk of fire and injury.



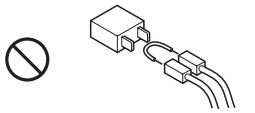
- Disabling fuse functions or bridging fuse terminals with wire, metal clips, solder or similar object.



- Disabling relay functions (such as wedging paper between relay contacts)

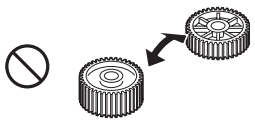


- Disabling safety functions (interlocks, safety circuits, etc.) Safety will not be assured, leading to a risk of fire and injury.



- Making any modification to the product unless instructed by KMBT

- Using parts not specified by KMBT



[2] POWER PLUG SELECTION

In some countries or areas, the power plug provided with the product may not fit wall outlet used in the area. In that case, it is obligation of customer engineer (hereafter called the CE) to attach appropriate power plug or power cord set in order to connect the product to the supply.

Power Cord Set or Power Plug

⚠ WARNING

- Use power supply cord set which meets the following criteria:
  - provided with a plug having configuration intended for the connection to wall outlet appropriate for the product's rated voltage and current, and
  - the plug has pin/terminal(s) for grounding, and
  - provided with three-conductor cable having enough current capacity, and
  - the cord set meets regulatory requirements for the area.

  Use of inadequate cord set leads to fire or electric shock.

- Attach power plug which meets the following criteria:
  - having configuration intended for the connection to wall outlet appropriate for the product's rated voltage and current, and
  - the plug has pin/terminal(s) for grounding, and
  - meets regulatory requirements for the area.

  Use of inadequate cord set leads to the product connecting to inadequate power supply (voltage, current capacity, grounding), and may result in fire or electric shock.

- Conductors in the power cable must be connected to terminals of the plug according to the following order:
  - Black or Brown: L (line)
  - White or Light Blue: N (neutral)
  - Green/Yellow: PE (earth)

  Wrong connection may cancel safeguards within the product, and results in fire or electric shock.

[3] CHECKPOINTS WHEN PERFORMING ON-SITE SERVICE

KONICA MINOLTA brand products are extensively tested before shipping, to ensure that all applicable safety standards are met, in order to protect the customer and customer engineer (hereafter called the CE) from the risk of injury. However, in daily use, any electrical equipment may be subject to parts wear and eventual failure. In order to maintain safety and reliability, the CE must perform regular safety checks.

1. Power Supply

Connection to Power Supply

⚠ WARNING

- Check that mains voltage is as specified.

  Connection to wrong voltage supply may result in fire or electric shock.

- Connect power plug directly into wall outlet having same configuration as the plug.

  Use of an adapter leads to the product connecting to inadequate power supply (voltage, current capacity, grounding), and may result in fire or electric shock.

  If proper wall outlet is not available, advice the customer to contact qualified electrician for the installation.

- Plug the power cord into the dedicated wall outlet with a capacity greater than the maximum power consumption.

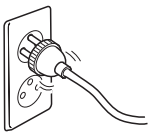
  If excessive current flows in the wall outlet, fire may result.

- If two or more power cords can be plugged into the wall outlet, the total load must not exceed the rating of the wall outlet.

  If excessive current flows in the wall outlet, fire may result.

- Make sure the power cord is plugged in the wall outlet securely.

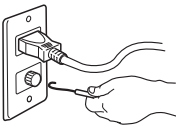
  Contact problems may lead to increased resistance, overheating, and the risk of fire.



- Check whether the product is grounded properly.

  If current leakage occurs in an ungrounded product, you may suffer electric shock while operating the product.

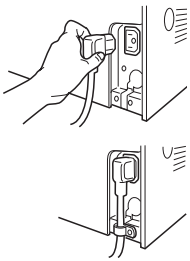
  Connect power plug to grounded wall outlet.



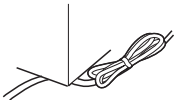
Power Plug and Cord

⚠ WARNING

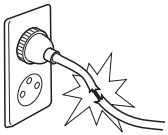
- When using the power cord set (inlet type) that came with this product, make sure the connector is securely inserted in the inlet of the product.
  When securing measure is provided, secure the cord with the fixture properly.
  If the power cord (inlet type) is not connected to the product securely, a contact problem may lead to increased resistance, overheating, and risk of fire.



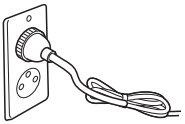
- Check whether the power cord is not stepped on or pinched by a table and so on.
  Overheating may occur there, leading to a risk of fire.



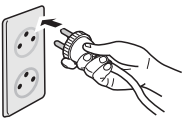
- Check whether the power cord is damaged. Check whether the sheath is damaged.
  If the power plug, cord, or sheath is damaged, replace with a new power cord (with plug and connector on each end) specified by KMBT. Using the damaged power cord may result in fire or electric shock.



- Do not bundle or tie the power cord.
  Overheating may occur there, leading to a risk of fire.

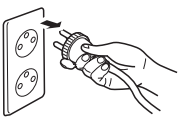


- Check whether dust is collected around the power plug and wall outlet.
  Using the power plug and wall outlet without removing dust may result in fire.



- Do not insert the power plug into the wall outlet with a wet hand.
  The risk of electric shock exists.

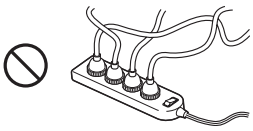
- When unplugging the power cord, grasp the plug, not the cable.
  The cable may be broken, leading to a risk of fire and electric shock.



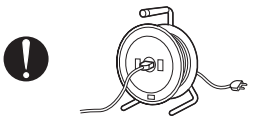
Wiring

⚠ WARNING

- Never use multi-plug adapters to plug multiple power cords in the same outlet.
  If used, the risk of fire exists.



- When an extension cord is required, use a specified one. Current that can flow in the extension cord is limited, so using a too long extension cord may result in fire.
  Do not use an extension cable reel with the cable taken up. Fire may result.

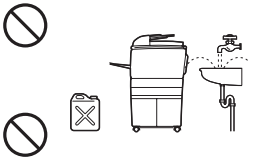


2. Installation Requirements

Prohibited Installation Places

⚠ WARNING

- Do not place the product near flammable materials or volatile materials that may catch fire.
  A risk of fire exists.

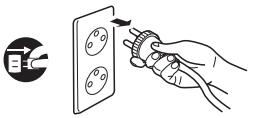


- Do not place the product in a place exposed to water such as rain.
  A risk of fire and electric shock exists.

When not Using the Product for a long time

⚠ WARNING

- When the product is not used over an extended period of time (holidays, etc.), switch it off and unplug the power cord.
  Dust collected around the power plug and outlet may cause fire.



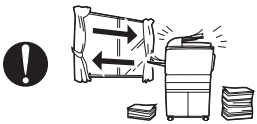
Ventilation

⚠ CAUTION

- The product generates ozone gas during operation, but it will not be harmful to the human body.

  If a bad smell of ozone is present in the following cases, ventilate the room.

  a. When the product is used in a poorly ventilated room
  b. When taking a lot of copies
  c. When using multiple products at the same time



Stability

⚠ CAUTION

- Be sure to lock the caster stoppers.

  In the case of an earthquake and so on, the product may slide, leading to a injury.

Inspection before Servicing

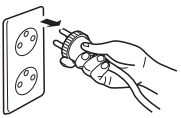
⚠ CAUTION

- Before conducting an inspection, read all relevant documentation (service manual, technical notices, etc.) and proceed with the inspection following the prescribed procedure, using only the prescribed tools. Do not make any adjustment not described in the documentation.

  If the prescribed procedure or tool is not used, the product may break and a risk of injury or fire exists.

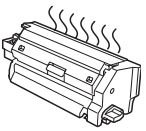
- Before conducting an inspection, be sure to disconnect the power plugs from the product and options.

  When the power plug is inserted in the wall outlet, some units are still powered even if the POWER switch is turned OFF. A risk of electric shock exists.



- The area around the fixing unit is hot.

  You may get burnt.

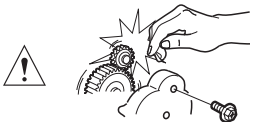


Work Performed with the Product Powered On

⚠ WARNING

- Take every care when making adjustments or performing an operation check with the product powered.

  If you make adjustments or perform an operation check with the external cover detached, you may touch live or high-voltage parts or you may be caught in moving gears or the timing belt, leading to a risk of injury.



- Take every care when servicing with the external cover detached.

  High-voltage exists around the drum unit. A risk of electric shock exists.

Safety Checkpoints

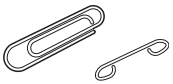
⚠ WARNING

- Check the exterior and frame for edges, burrs, and other damage.

  The user or CE may be injured.

- Do not allow any metal parts such as clips, staples, and screws to fall into the product.

  They can short internal circuits and cause electric shock or fire.



- Check wiring for squeezing and any other damage.

  Current can leak, leading to a risk of electric shock or fire.

- Carefully remove all toner remnants and dust from electrical parts and electrode units such as a charging corona unit.

  Current can leak, leading to a risk of product trouble or fire.

- Check high-voltage cables and sheaths for any damage.

  Current can leak, leading to a risk of electric shock or fire.

Safety Checkpoints

⚠ WARNING

- Check electrode units such as a charging corona unit for deterioration and sign of leakage.

  Current can leak, leading to a risk of trouble or fire.

- Before disassembling or adjusting the write unit (P/H unit) incorporating a laser, make sure that the power cord has been disconnected.

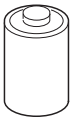
  The laser light can enter your eye, leading to a risk of loss of eyesight.

- Do not remove the cover of the write unit. Do not supply power with the write unit shifted from the specified mounting position.

  The laser light can enter your eye, leading to a risk of loss of eyesight.

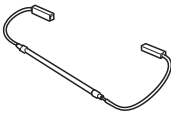
- When replacing a lithium battery, replace it with a new lithium battery specified in the Parts Guide Manual. Dispose of the used lithium battery using the method specified by local authority.

  Improper replacement can cause explosion.



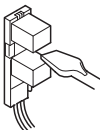
- After replacing a part to which AC voltage is applied (e.g., optical lamp and fixing lamp), be sure to check the installation state.

  A risk of fire exists.



- Check the interlock switch and actuator for loosening and check whether the interlock functions properly.

  If the interlock does not function, you may receive an electric shock or be injured when you insert your hand in the product (e.g., for clearing paper jam).



- Make sure the wiring cannot come into contact with sharp edges, burrs, or other pointed parts.

  Current can leak, leading to a risk of electric shock or fire.

Safety Checkpoints

⚠ WARNING

- Make sure that all screws, components, wiring, connectors, etc. that were removed for safety check and maintenance have been reinstalled in the original location. (Pay special attention to forgotten connectors, pinched cables, forgotten screws, etc.)

  A risk of product trouble, electric shock, and fire exists.

Handling of Consumables

⚠ WARNING

- Toner and developer are not harmful substances, but care must be taken not to breathe excessive amounts or let the substances come into contact with eyes, etc. It may be stimulative.

  If the substances get in the eye, rinse with plenty of water immediately. When symptoms are noticeable, consult a physician.

- Never throw the used cartridge and toner into fire.

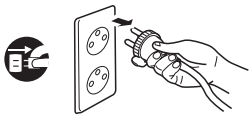
  You may be burned due to dust explosion.

Handling of Service Materials

⚠ CAUTION

- Unplug the power cord from the wall outlet.

  Drum cleaner (isopropyl alcohol) and roller cleaner (acetone-based) are highly flammable and must be handled with care. A risk of fire exists.



- Do not replace the cover or turn the product ON before any solvent remnants on the cleaned parts have fully evaporated.

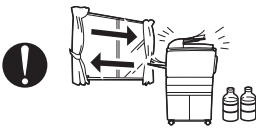
  A risk of fire exists.

Handling of Service Materials

⚠ CAUTION

- Use only a small amount of cleaner at a time and take care not to spill any liquid. If this happens, immediately wipe it off.
  A risk of fire exists.

- When using any solvent, ventilate the room well.
  Breathing large quantities of organic solvents can lead to discomfort.



[4] Used Batteries Precautions

ALL Areas

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

Germany

VORSICHT!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.
Ersatz nur durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ.
Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

France

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.
Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

Denmark

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

Finland, Sweden

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens instruktion.

Norway

ADVARSEL

Eksplosjonsfare ved feilaktig skifte av batteri.
Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten.
Brukte batterier kasseres i henhold til fabrikantens instruksjoner.

[5] FUSE

CAUTION **Double pole / neutral fusing**

ATTENTION **Double pôle / fusible sur le neutre.**

[6] Laser Safety

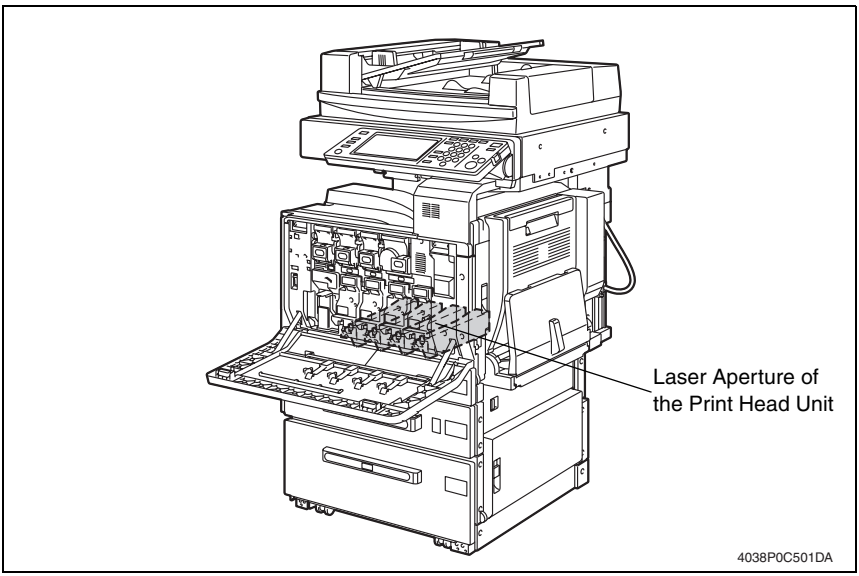
- This is a digital machine certified as a Class 1 laser product. There is no possibility of danger from a laser, provided the machine is serviced according to the instruction in this manual.

6.1 Internal Laser Radiation

semiconductor laser	
Maximum power of the laser diode	10 mW
Maximum average radiation power (*)	8.0 µW
Wavelength	775-800 nm

*at laser aperture of the Print Head Unit

- This product employs a Class 3B laser diode that emits an invisible laser beam. The laser diode and the scanning polygon mirror are incorporated in the print head unit.
- The print head unit is NOT A FIELD SERVICEABLE ITEM. Therefore, the print head unit should not be opened under any circumstances.



U.S.A., Canada
(CDRH Regulation)

- This machine is certified as a Class 1 Laser product under Radiation Performance Standard according to the Food, Drug and Cosmetic Act of 1990. Compliance is mandatory for Laser products marketed in the United States and is reported to the Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration of the U.S. Department of Health and Human Services (DHHS). This means that the device does not produce hazardous laser radiation.

- The label shown on page S-16 indicates compliance with the CDRH regulations and must be attached to laser products marketed in the United States.

CAUTION
- **Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.**

semiconductor laser	
Maximum power of the laser diode	10 mW
Wavelength	775-800 nm

All Areas

CAUTION
- **Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.**

semiconductor laser	
Maximum power of the laser diode	10 mW
Wavelength	775-800 nm

Denmark

ADVARSEL
- **Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion. Undgå udsættelse for stråling. Klasse 1 laser produkt der opfylder IEC60825-1 sikkerheds kravene.**

halvlederlaser	
Laserdiodens højeste styrke	10 mW
bølgelængden	775-800 nm

Finland, Sweden

LUOKAN 1 LASERLAITE
KLASS 1 LASER APPARAT

VAROITUS!
- **Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle lasersäteilylle.**

puolijohdelaser	
Laserdiodin suurin teho	10 mW
aallonpituus	775-800 nm

VARNING!
- **Om apparaten används på annat sätt än i denna bruksanvisning specificerats, kan användaren utsättas för osynlig laserstrålning, som överskrider gränsen för laserklass 1.**

halvledarlaser	
Den maximala effekten för laserdioden	10 mW
våglängden	775-800 nm

VARO!
- **Avattaessa ja suojalukitus ohitettaessa olet alttiina näkymättomälle lasersäteilylle. Älä katso säteeseen.**

VARNING!
- **Osynlig laserstråining när denna del är öppnad och spärren är urkopplad. Betrakta ej stråien.**

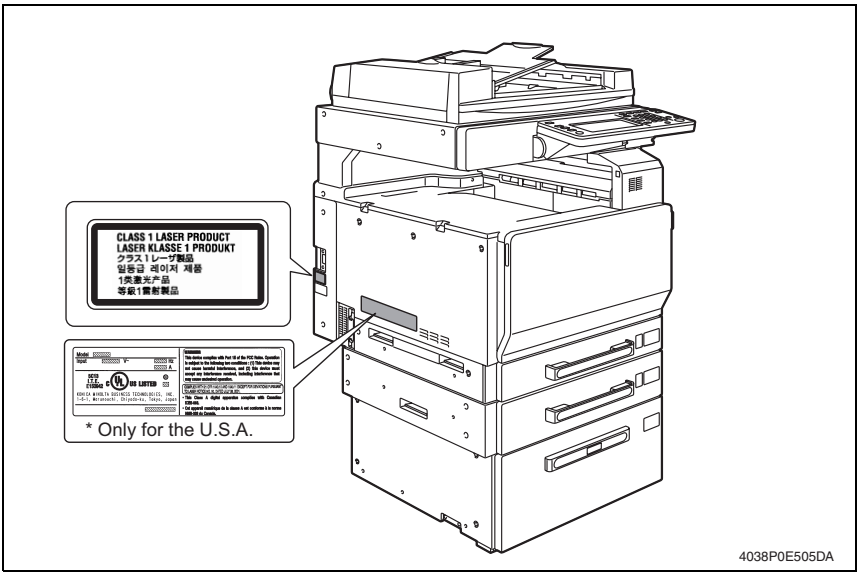
Norway

ADVERSEL
- **Dersom apparatet brukes på annen måte enn spesifisert i denne bruksanvisning, kan brukeren utsettes för unsynlig laserstrålning, som overskrider grensen for laser klass 1.**

halvleder laser	
Maksimal effekt till laserdiode	10 mW
bølgelengde	775-800 nm

6.2 Laser Safety Label

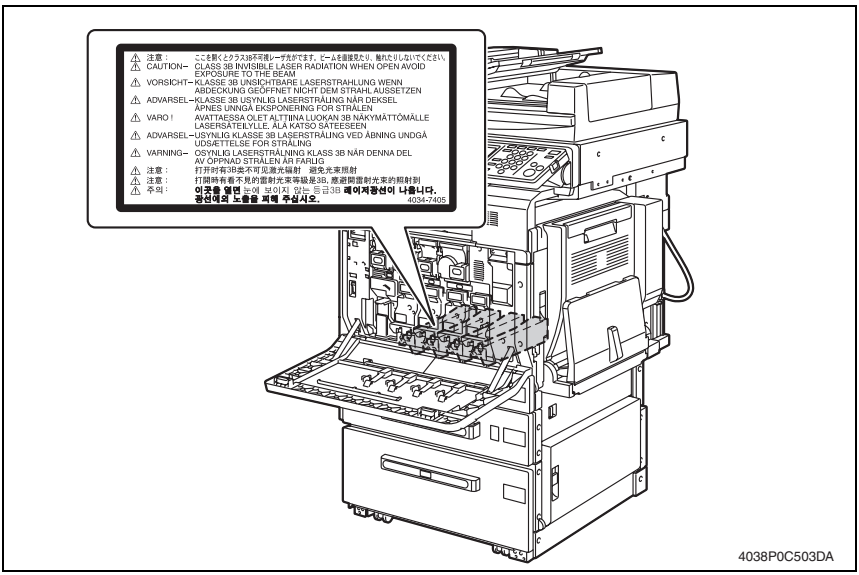
- A laser safety label is attached to the inside of the machine as shown below.



4038P0E505DA

6.3 Laser Caution Label

- A laser caution label is attached to the outside of the machine as shown below.


注意：
CAUTION– CLASS 3B INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO THE BEAM
VORSICHT– KLASSE 3B UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETZEN
ADVARSEL– KLASSE 3B USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN
VARO ! AVATTAESSA OLET ALTTIINA LUOKAN 3B NÄKYMÄTTÖMÄLLE LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN
ADVARSEL– USYNLIG KLASSE 3B LASERSTRÅLING VED ÅBNING UNDGÅ UDSÆTTELSE FOR STRÅLING
VARNING– OSYNLIG LASERSTRÅLNING KLASS 3B NÄR DENNA DEL AV ÖPPNAD STRÅLEN ÄR FARLIG
注意：
注意：
주의：
4034-7405

4038P0C503DA

6.4 PRECAUTIONS FOR HANDLING THE LASER EQUIPMENT

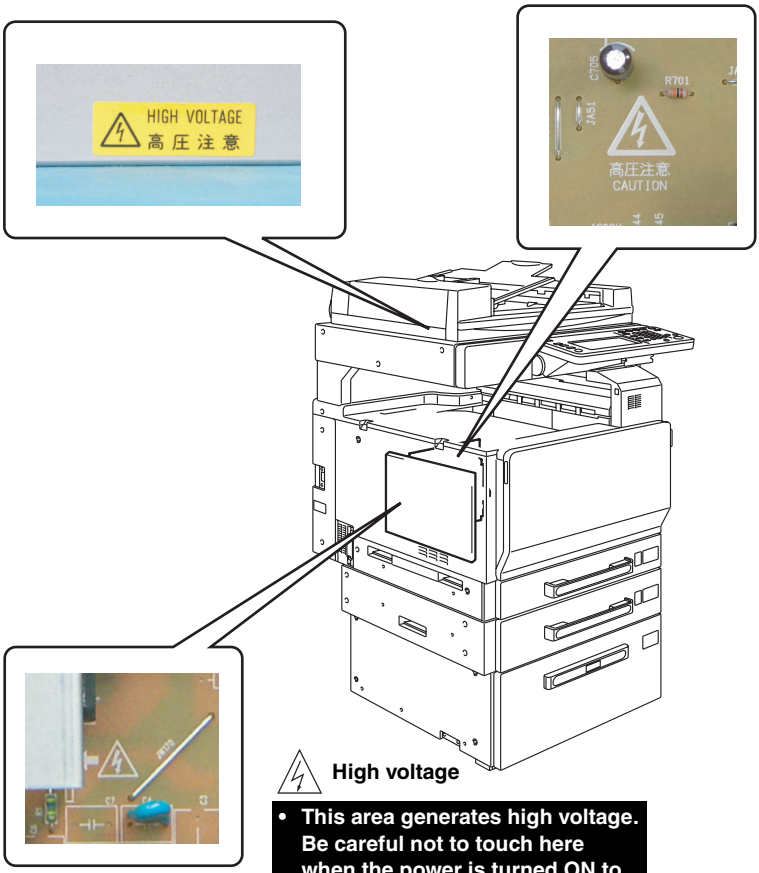
- When laser protective goggles are to be used, select ones with a lens conforming to the above specifications.
- When a disassembly job needs to be performed in the laser beam path, such as when working around the printerhead and PC Drum, be sure first to turn the printer OFF.
- If the job requires that the printer be left ON, take off your watch and ring and wear laser protective goggles.
- A highly reflective tool can be dangerous if it is brought into the laser beam path. Use utmost care when handling tools on the user's premises.
- The Print Head is not to be disassembled or adjusted in the field. Replace the Unit or Assembly including the Control Board. Therefore, remove the Laser Diode, and do not perform Control Board trimmer adjustment.

WARNING INDICATIONS ON THE MACHINE

Caution labels shown are attached in some areas on/in the machine.
When accessing these areas for maintenance, repair, or adjustment, special care should be taken to avoid burns and electric shock.

High voltage

- **This area generates high voltage. Be careful not to touch here when the power is turned ON to avoid getting an electric shock.**



High voltage

- **This area generates high voltage. Be careful not to touch here when the power is turned ON to avoid getting an electric shock.**

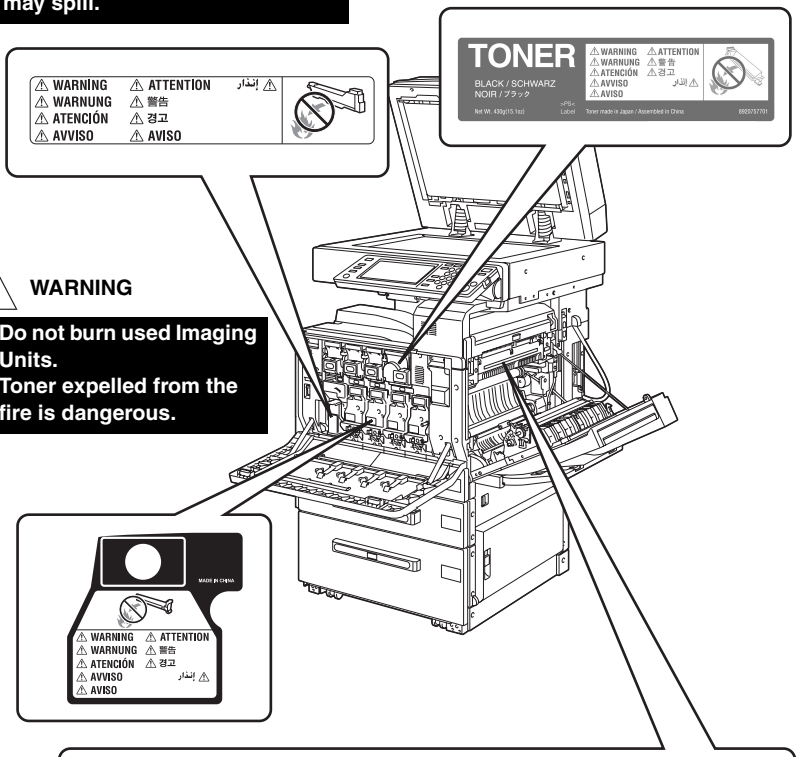
4038P0C506DA

WARNING

- **Do not position the used Waste Toner Box so that it is standing on end or tilted, otherwise toner may spill.**

WARNING

- **Do not burn used Toner Cartridges. Toner expelled from the fire is dangerous.**



WARNING

- **Do not burn used Imaging Units.**
  Toner expelled from the fire is dangerous.

CAUTION High Temperature!	ATTENTION Température élevée!	CUIDADO Alta temperatura!	注意 高温！		
VORSICHT Heiße Oberfläche!	PRECAUCIÓN ¡Temperatura alta!	ATTENZIONE Alta temperatura!	注意 高温！	تحذير حرارة عالية!	주의 고온！

CAUTION

- **The area around the Fusing Unit is extremely hot. Touching any part other than those indicated may result in burns.**

4038P0C504DA

CAUTION:

- **You may be burned or injured if you touch any area that you are advised not to touch by any caution label. Do not remove caution labels. If any caution label has come off or soiled and therefore the caution cannot be read, contact our Service Office.**

MEASURES TO TAKE IN CASE OF AN ACCIDENT

1. If an accident has occurred, the distributor who has been notified first must immediately take emergency measures to provide relief to affected persons and to prevent further damage.
2. If a report of a serious accident has been received from a customer, an on-site evaluation must be carried out quickly and KMBT must be notified.
3. To determine the cause of the accident, conditions and materials must be recorded through direct on-site checks, in accordance with instructions issued by KMBT.
4. For reports and measures concerning serious accidents, follow the regulations specified by every distributor.

Composition of the service manual

This service manual consists of Theory of Operation section and Field Service section to explain the main machine and its corresponding options.

Theory of Operation section gives, as information for the CE to get a full understanding of the product, a rough outline of the object and role of each function, the relationship between the electrical system and the mechanical system, and the timing of operation of each part.

Field Service section gives, as information required by the CE at the site (or at the customer's premise), a rough outline of the service schedule and its details, maintenance steps, the object and role of each adjustment, error codes and supplementary information.

The basic configuration of each section is as follows. However some options may not be applied to the following configuration.

<Theory of Operation section>

OUTLINE:	Explanation of system configuration, product specifications, unit configuration, and paper path
COMPOSITION/OPERATION:	Explanation of configuration of each unit, operating system, and control system

<Field Service section>

GENERAL:	Explanation of system configuration, and product specifications
MAINTENANCE:	Explanation of service schedule, maintenance steps, service tools, removal/reinstallation methods of major parts, and firmware version up method etc.
ADJUSTMENT/SETTING:	Explanation of utility mode, service mode, and mechanical adjustment etc.
TROUBLESHOOTING:	Explanation of lists of jam codes and error codes, and their countermeasures etc.
APPENDIX:	Parts layout drawings, connector layout drawings, timing chart, overall layout drawing are attached.

Notation of the service manual

A. Product name

In this manual, each of the products is described as follows:

(1)	PWB-MFP:	MFP Control Board
(2)	bizhub C250/C252:	Main Unit
(3)	Microsoft Windows 95:	Windows 95
	Microsoft Windows 98:	Windows 98
	Microsoft Windows Me:	Windows Me
	Microsoft Windows NT 4.0:	Windows NT 4.0 or Windows NT
	Microsoft Windows 2000:	Windows 2000
	Microsoft Windows XP:	Windows XP
	When the description is made in combination of the OS's mentioned above:	
		Windows 95/98/Me
		Windows NT 4.0/2000
		Windows NT/2000/XP
		Windows 95/98/Me/ NT/2000/XP

B. Brand name

The company names and product names mentioned in this manual are the brand name or the registered trademark of each company.

C. Feeding Direction

- When the long side of the paper is parallel with the feeding direction, it is called Short Edge Feeding. The feeding direction which is perpendicular to the Short Edge Feeding is called the Long Edge Feeding.
- Short Edge Feeding will be identified with [S (Abbreviation for Short Edge Feeding)] on the paper size. No specific notation is added for the Long Edge Feeding.
  When the size has only the Short Edge Feeding with no Long Edge Feeding, [S] will not be added to the paper size.

<Sample notation>

Paper size	Feeding direction	Notation
A4	Long Edge Feeding	A4
	Short Edge Feeding	A4S
A3	Short Edge Feeding	A3

KONICA MINOLTA

SERVICE MANUAL THEORY OF OPERATION

bizhub

C250 / C252 Main Unit

2006.08

KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 3.0

Revision history

After publication of this service manual, the parts and mechanism may be subject to change for improvement of their performance.
Therefore, the descriptions given in this service manual may not coincide with the actual machine.

When any change has been made to the descriptions in the service manual, a revised version will be issued with a revision mark added as required.

Revision mark:

- To indicate clearly a section revised, show △1 to the left of the revised section.
  A number within △1 represents the number of times the revision has been made.

- To indicate clearly a section revised, show ▲1 in the lower outside section of the corresponding page.
  A number within ▲1 represents the number of times the revision has been made.

NOTE

Revision marks shown in a page are restricted only to the latest ones with the old ones deleted.

- When a page revised in Ver. 2.0 has been changed in Ver. 3.0:
  The revision marks for Ver. 3.0 only are shown with those for Ver. 2.0 deleted.
- When a page revised in Ver. 2.0 has not been changed in Ver. 3.0:
  The revision marks for Ver. 2.0 are left as they are.

2006/08	3.0	△2	Added the description of bizhub C252/ Error corrections / Corresponded to a Card Version G4
2006/02	2.0	△1	Error corrections / Corresponded to a Card Version 81
2005/07	1.0	—	Issue of the first edition
Date	Service manual Ver.	Revision mark	Descriptions of revision

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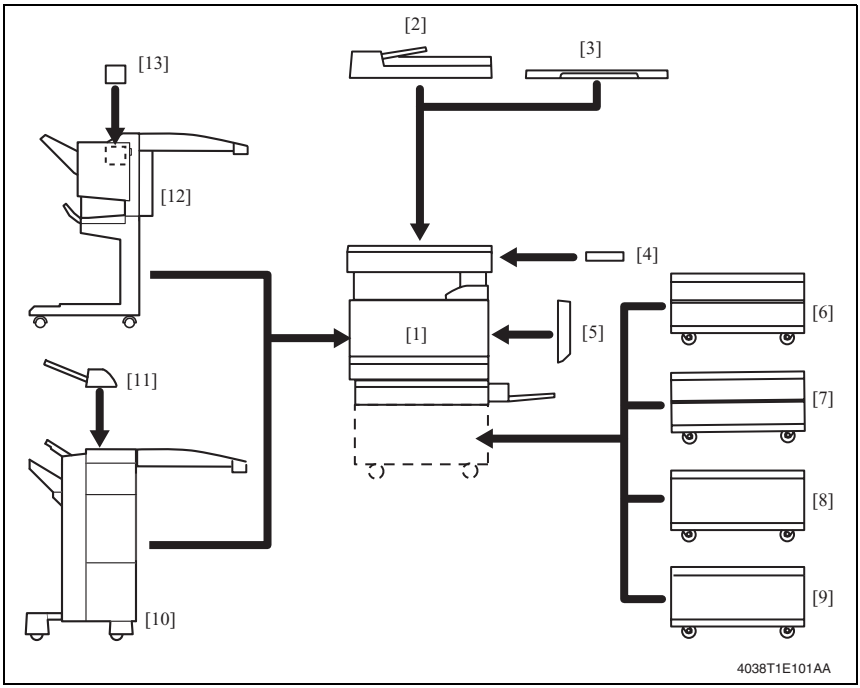
General

1. System configuration

1/2 System front view (bizhub C250)



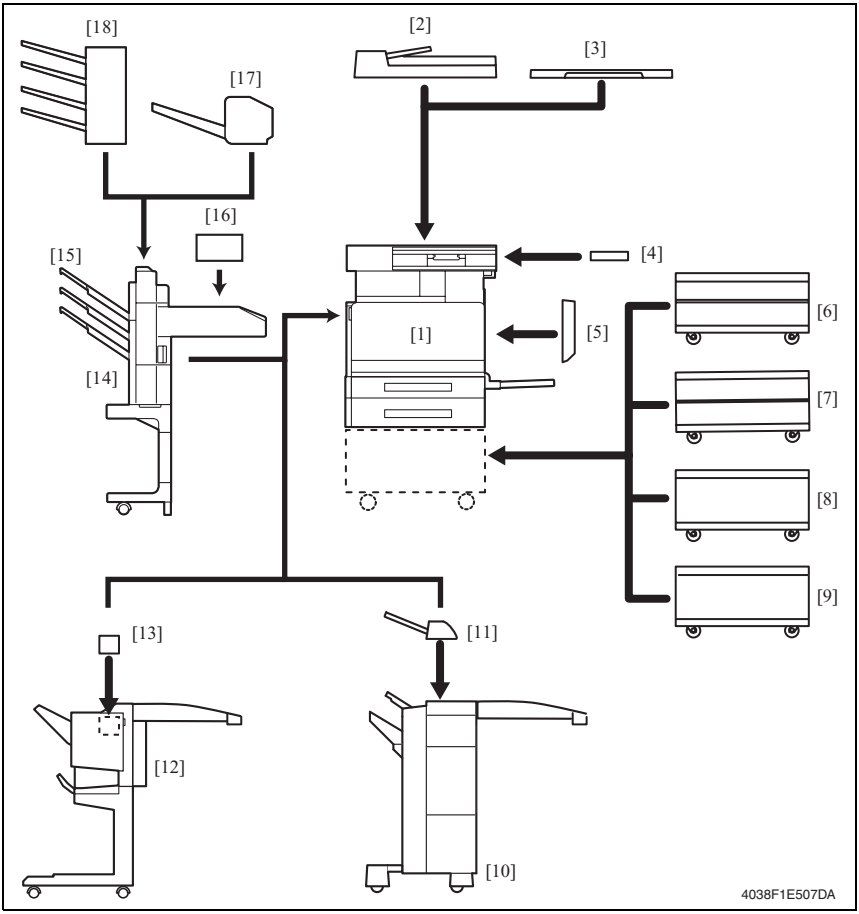
[1]	Machine	[8]	Paper feed cabinet PC-403
[2]	Reverse automatic document feeder DF-601	[9]	Desk DK-502
[3]	Original cover OC-501	[10]	Finisher FS-501
[4]	Working table WT-501	[11]	Job separator JS-601
[5]	Auto duplex unit AD-503 *1	[12]	Finisher FS-603
[6]	Paper feed cabinet PC-103	[13]	Punch kit (for FS-603) PK-501
[7]	Paper feed cabinet PC-203		

*1: Ones for Europe or North America will be with the standard equipment.

NOTE

- **Use the desk or the paper feed cabinet without fail when installing on the floor in order to keep the function and quality of the unit.**

2 1/2 System front view (bizhub C252)



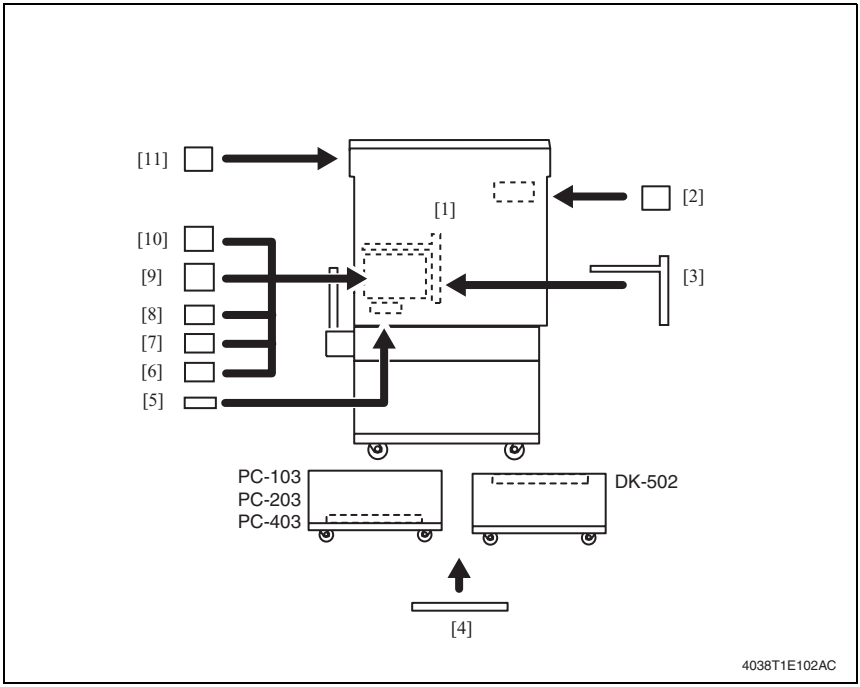
[1]	Machine	[10]	Finisher FS-501
[2]	Reverse automatic document feeder DF-601	[11]	Job separator JS-601
[3]	Original cover OC-501	[12]	Finisher FS-603
[4]	Working table WT-501	[13]	Punch kit (for FS-603) PK-501
[5]	Auto duplex unit AD-503 *1	[14]	Finisher FS-514
[6]	Paper feed cabinet PC-103	[15]	Output tray OT-601
[7]	Paper feed cabinet PC-203	[16]	Punch kit PK-510
[8]	Paper feed cabinet PC-403	[17]	Mailbin kit MT-501
[9]	Desk DK-502	[18]	Saddle stitcher SD-503

*1: Ones for Europe will be with the standard equipment.

NOTE

- **Use the desk or the paper feed cabinet without fail when installing on the floor in order to keep the function and quality of the unit.**

2/2 System rear view



[1] Machine

[2] Vendor kit VK-501
* Only for Europe, North America, and latin America (only 120V area)

[3] Mount kit MK-706

[4] Dehumidifier heater HT-501

[5] Mount kit MK-704

[6] Fax multi line ML-501

[7] Scan accelerator kit SA-501

[8] Security kit SC-503

[9] Local interface kit EK-702

[10] Fax kit FK-502
* Only for Europe, north America, latin America and Australia

[11] Key counter kit KIT-1

2. Product specifications

2.1 Type

Type	Desktop/Console*1 scanner/printer
Copying system	Electrostatic dry-powdered image transfer to plain paper
Printing process	Tandem-type indirect electrostatic recording system
PC drum type	OPC (organic photo conductor)
Scanning density	Equivalent to 600 dpi
Exposure lamp	White rare-gas fluorescent lamp 30 W
Platen	Stationary (mirror scan)
Original scanning	Scanning in main scanning direction with a CCD (one-shot reading system)
Registration	Rear left edge
Paper feeding system (standard) Three-way system	Multiple Bypass: 100 sheets Tray1: 250 sheets Tray2: 500 sheets
Exposure system	• Four-multi array PH unit system • Two-beam LD + polygon mirror exposure system for Y, M, C, and K (8 beams in total)
△2 Exposure density	Equivalent to 1800 dpi in main scanning direction × 600 dpi in sub scanning direction
Developing system	HMT developing system
Charging system	DC comb electrode Scorotron system with electrode cleaning function (manual) *Electrode cleaning function is mounted only on the K imaging unit.
Image transfer system	Intermediate transfer belt system
Paper separating system	Selection either application of nonwoven fabric bias or resistor grounding + lower-pressure paper separate claws
Fusing system	Roller fusing

*1: Only when the optional paper feed cabinet/desk is installed.

2.2 Functions

Types of original	Sheets, books, and three-dimensional objects		
Max. original size	A3 or 11 × 17 (ledger)		
Max. original weight	Max. 2 kg		
Multiple copies	1 to 999		
Warm-up time	110 sec. or less (at ambient temperature of 23° C/73.4° F and rated source voltage)		
Image loss	Leading edge: 4.2 mm, Trailing edge (copier, printer): 4.2 mm, Trailing edge (FAX): 3 mm, Rear edge: 3 mm, Front edge: 3 mm		
First copy time	(Tray1, A4, full size)		
	Monochrome print	8.4 sec. or less	
	Color print	11.7 sec. or less	
System speed	Plain paper Monochrome/full color	111 mm/sec	
	Thick paper (90 to 256 g/m^2), OHP, post card, envelope, label sheet	55.5 mm/sec	
Copying speed for multi-copy cycle (A4, 8-1/2 × 11 crosswise feeding)	Monochrome print	1-sided: 25 copies/min.; 2-sided: 23 copies/min.	
	Color print (text mode, text/photo mode, special quality mode)	1-sided: 25 copies/min.; 2-sided: 23 copies/min.	
Fixed zoom ratios	Full size	×1.000	
	Reduction	Metric area:	×0.500, ×0.707, ×0.816, ×0.866
		Inch area:	×0.500, ×0.647, ×0.733, ×0.785
	Enlargement	Metric area:	×1.154, ×1.224, ×1.414, ×2.000
		Inch area:	×1.214, ×1.294, ×1.545, ×2.000
	Zoom ratios memory	3 memories	
Variable zoom ratios	×0.250 to ×4.000	in 0.001 increments	
Copy paper size	Tray1, bypass	Metric area:	A3 to A5, B6S, A3 Wide (12 $^1/_4$ × 18), A6S, thick paper
		Inch area:	11×17 to 5 $^1/_2$ × 8 $^1/_2$, A3 Wide (12 $^1/_4$ × 18), 4×6S, thick paper
	Tray2	Metric area:	A3 to B5, A5S
		Inch area:	11×17 to 8 $^1/_2$ × 11, 8 $^1/_2$ × 11S
Copy exit tray capacity	Plain Paper	350 sheets	
	Thick Paper	20 sheets	
	OHP transparencies	1 sheet	

2.3 Types of paper

Type		Paper source		
		Tray1	Tray2	Multiple bypass
Copy paper type	Plain paper (60 to 90 g/m²)	❍	❍	❍
	Translucent paper	–	–	–
	OHP transparencies (crosswise feeding only)	❍ (20 sheets or less)	–	❍ (10 sheets or less)
	Thick paper 1 (91 to 150 g/m²)		–	
	Thick paper 2 (151 to 209 g/m²)		–	
	Thick paper 3 (210 to 256 g/m²) *1		–	
	Postcards		–	
	Envelopes		–	
	Labels		–	
⚠1	Long size paper (127 to 160 g/m²)	–	–	❍
Copy paper dimensions	Width	90 to 311.1 mm	139.7 to 297 mm	90 to 311.1 mm
	Length	139.7 to 457.2 mm	182 to 431.8 mm	139.7 to 457.2 mm
⚠1	Long size paper (width x length)	–	–	210 to 297 mm x 1200 mm or less

*1: Image is not guaranteed when thick paper 3 is used.
Optional paper feed cabinet : Only the plain paper (weighing 64 to 90 g/m^2) is reliably fed.
Automatic duplex unit : Only the plain paper weighing 64 to 90 g/m^2 or thick paper weighing 91 to 256 g/m^2 are reliably fed.

2.4 Maintenance

Machine durability	600,000 prints or 5 years, whichever is earlier	
No. of pages printed per month (average)	Color print	1,200 prints
	Monochrome print	4,800 prints
Standard copy mode	Color print	3 pages/job
	Monochrome print	3 pages/job
Standard original density	Color print	C, M, Y, K 5%
	Monochrome print	K 5%

2.5 Machine specifications

Power requirements	voltage:	AC 110 V, 120 V, 127 V, 220-240 V
	frequency:	50/60 Hz ± 3.0 Hz
Max power consumption		Less than 1,500 W (120 V, 12 A / 220 - 240 V, 8 A)
⚠2 Dimensions	bizhub C250	653 *2 (W) × 755 (D) × 771 *3 (H) mm 25.7 *2 (W) × 29.8 (D) × 30.4 (H) inch
	bizhub C252	650 *2 (W) × 755 (D) × 771 *3 (H) mm 25.6 *2 (W) × 29.8 (D) × 30.4 (H) inch
⚠2 Space requirements	bizhub C250	1,857 (W) × 1,102 (D) mm *4 73 (W) × 43.4 (D) inch *4
	bizhub C252	1,743 (W) × 1,149 (D) mm *5 68.6 (W) × 45.2 (D) inch *5
⚠2 Weight	bizhub C250	Approx. 94 kg / 207.2 lb (without IU and TC)
	bizhub C252	Approx. 95 kg / 209.4 lb (without IU and TC)
	IU and TC	8.9 kg

*2: Width when the bypass tray is closed
*3: Height up to where the original is placed
*4: Space requirements are the values when the finisher is slid to the maximum, the bypass tray is opened to the maximum, and the front door is open.
*5: Space requirements are the values when the finisher is slid to the maximum, the bypass tray is opened to the maximum, and the paper feed tray is slid to the maximum.

2.6 Operating environment

Temperature	10 to 30 °C / 50 to 86° F (with a fluctuation of 10° C / 18° F or less per hour)
Humidity	15 to 85% (Relative humidity with a fluctuation of 20%/h)
Levelness	Difference between front and back, right and left should be 1 degree or under.

2.7 Print functions

Type	Built-in printer controller		
CPU	PPC750 FX 466 MHz		
2 RAM	1 GB (shared with the C250/C252.)		
2 HDD	40 GB (shared with the C250/C252.)		
Interface	Standard: Ethernet (10 Base-T or 100 Base-TX) Option: USB 1.1, USB 2.0, or IEEE 1284		
Supported protocols	TCP/IP, IPX/SPX, NetBEUI, AppleTalk (EtherTalk)		
Print speed (A4, 8.5×11)	Monochrome print	1-sided: 25 pages/min; 2-sided: 23 pages/min	
	Color print	1-sided: 25 pages/min; 2-sided: 23 pages/min	
Printer language	PCL5e/c emulation PCL6 (XL Ver. 2.1) emulation PostScript 3 emulation (3011)		
2 Print resolution	Equivalent to 1800 dpi in main scanning direction ¥ 600 dpi in sub scanning direction		
Printer fonts	PCL Latin 80 fonts postscript 3 emulation latin 136 fonts		
Supported operating systems	Server	Windows NT 4.0, Windows 2000, or Windows Server 2003	
	Client	Windows 98 Second Edition, Windows Me, Windows 2000, Windows XP, or Windows NT 4.0 (SP6a) Mac OS 9.2 or later or Mac OS X 10.2 or 10.3	

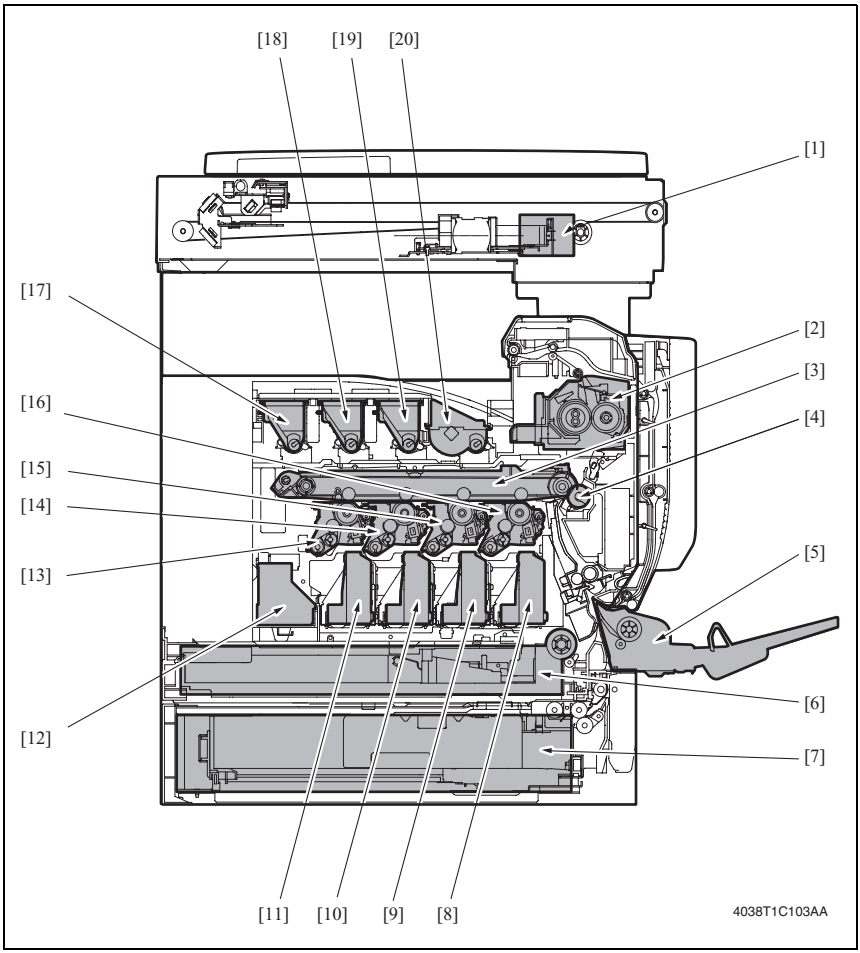
2.8 Scan functions

Driver	KONICA MINOLTA scanner driver
Compatible operating systems	Windows 98/98SE/Me, Windows NT 4.0 (SP6 or later), Windows 2000, Windows XP
Scan speed	25 pages/min. for both monochrome and full color (600 dpi, A4)
Scannable range	Same as the copier (Max. A3)
Functions	Scan to e-mail, scan to FTP, scan to SMB, scan to BOX
Resolution	200/300/400/600 dpi

NOTE

- **These specifications are subject to change without notice.**

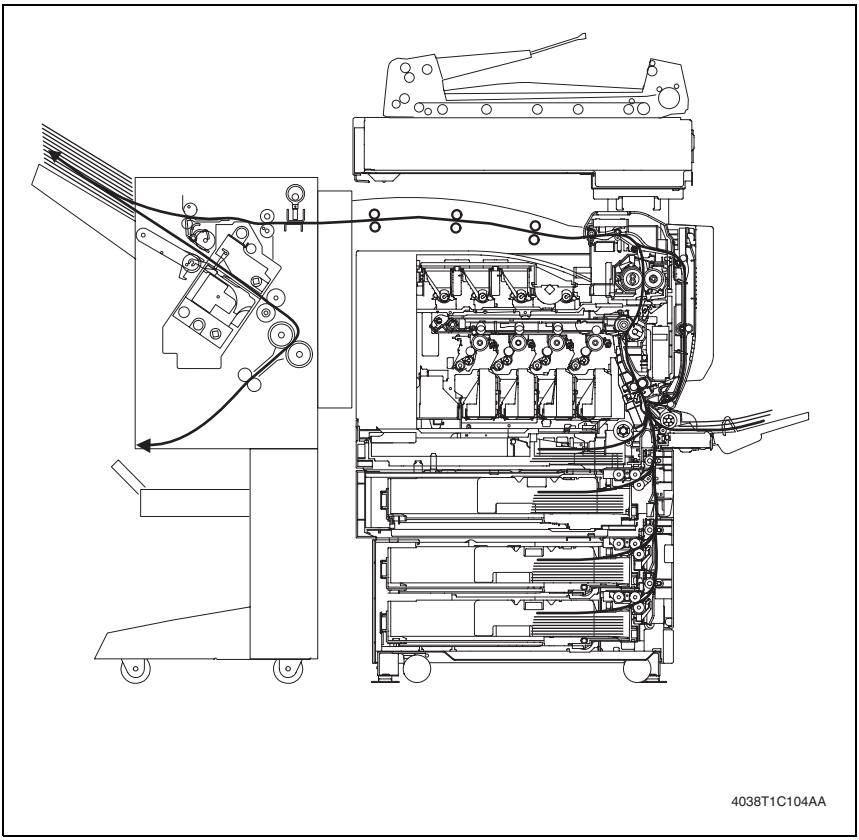
3. Center cross section



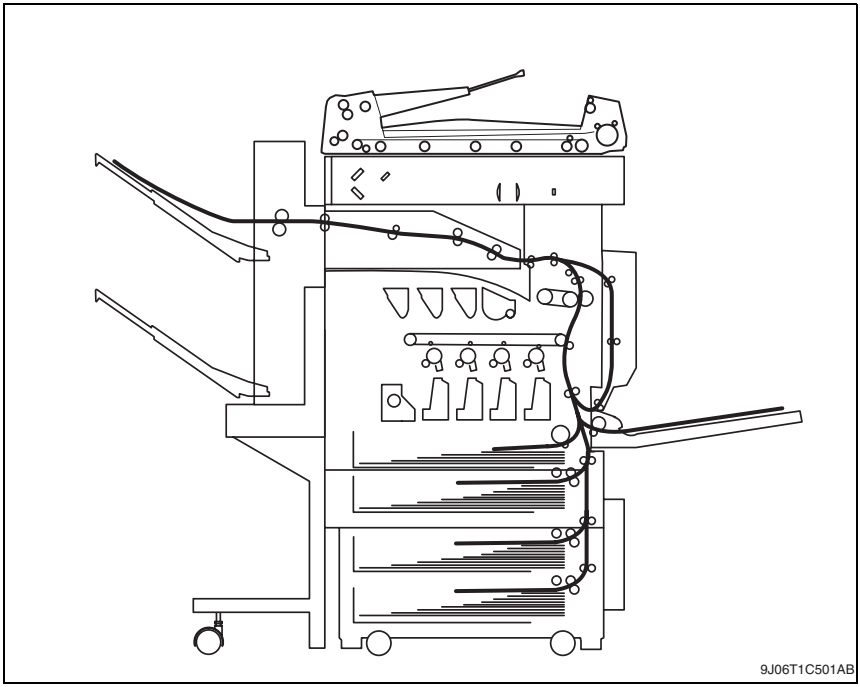
[1] CCD unit
[2] Fusing unit
[3] Transfer belt unit
[4] Image transfer roller
[5] Bypass tray
[6] Tray1
[7] Tray2
[8] Print head unit (PH unit) /K
[9] Print head unit (PH unit) /C
[10] Print head unit (PH unit) /M
[11] Print head unit (PH unit) /Y
[12] Waste toner box
[13] Imaging unit/Y
[14] Imaging unit/M
[15] Imaging unit/C
[16] Imaging unit/K
[17] Toner cartridge/Y
[18] Toner cartridge/M
[19] Toner cartridge/C
[20] Toner cartridge/K

4. Paper path

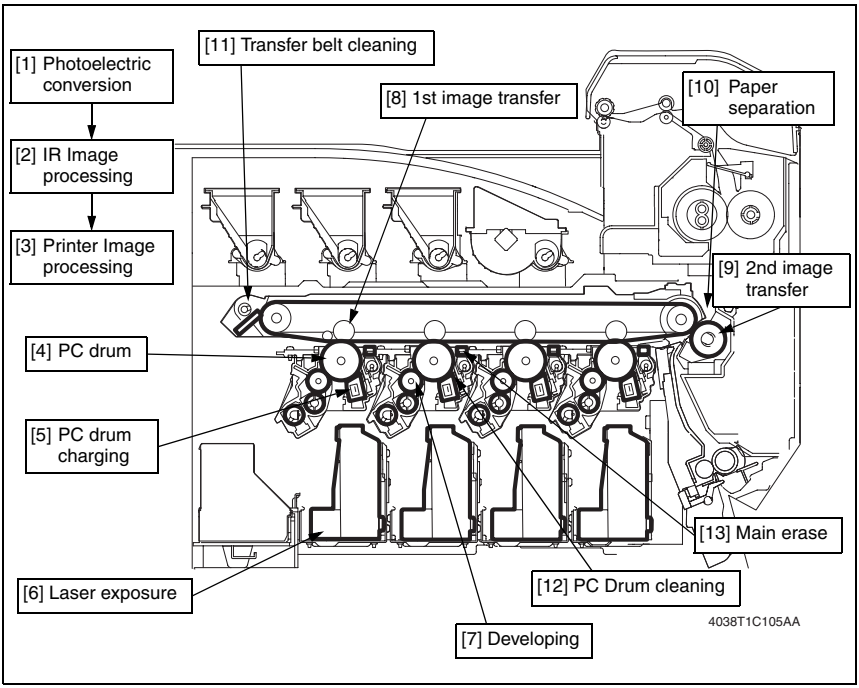
4.1 C250 paper path



4.2 C250 paper path



5. Image creation process



[1]	Photoelectric conversion	• The light reflected off the surface of the original is separated into different colors using the color filters (R, G, and B); CCD then converts it into a corresponding electric signal and outputs the signal to the IR imaging processing section.
[2]	IR image processing	• The electric signal is converted to 8-bit digital image signals. After going through some corrections, video signals (C, M, Y, and K) are output to the printer image processing section.
[3]	Printer image processing	• D/A conversion will be performed after the VIDEO signals (Y, M, C, Bk) are corrected. This data will control the emission of the laser diode.
[4]	PC drum	• The image of the original projected onto the surface of the PC drum is changed to a corresponding electrostatic latent image.
[5]	PC drum charging	• Supply DC (-) charge on the PC drum.
[6]	Laser exposure	• Expose photo conductor to a laser beam to develop electrostatic latent image.
[7]	Developing	• The toner, agitated and negatively charged in the developer mixing chamber, is attracted onto the electrostatic latent image formed on the surface of the PC drum. It is thereby changed to a visible, developed image. • AC and DC negative bias voltages are applied to the developing roller, thereby preventing toner from sticking to the background image portion.
[8]	1st image transfer	• A DC positive voltage is applied to the backside of the transfer belt, thereby allowing the visible, developed image on the surface of each of the PC drums (Y, M, C, and K) to be transferred onto the transfer belt.

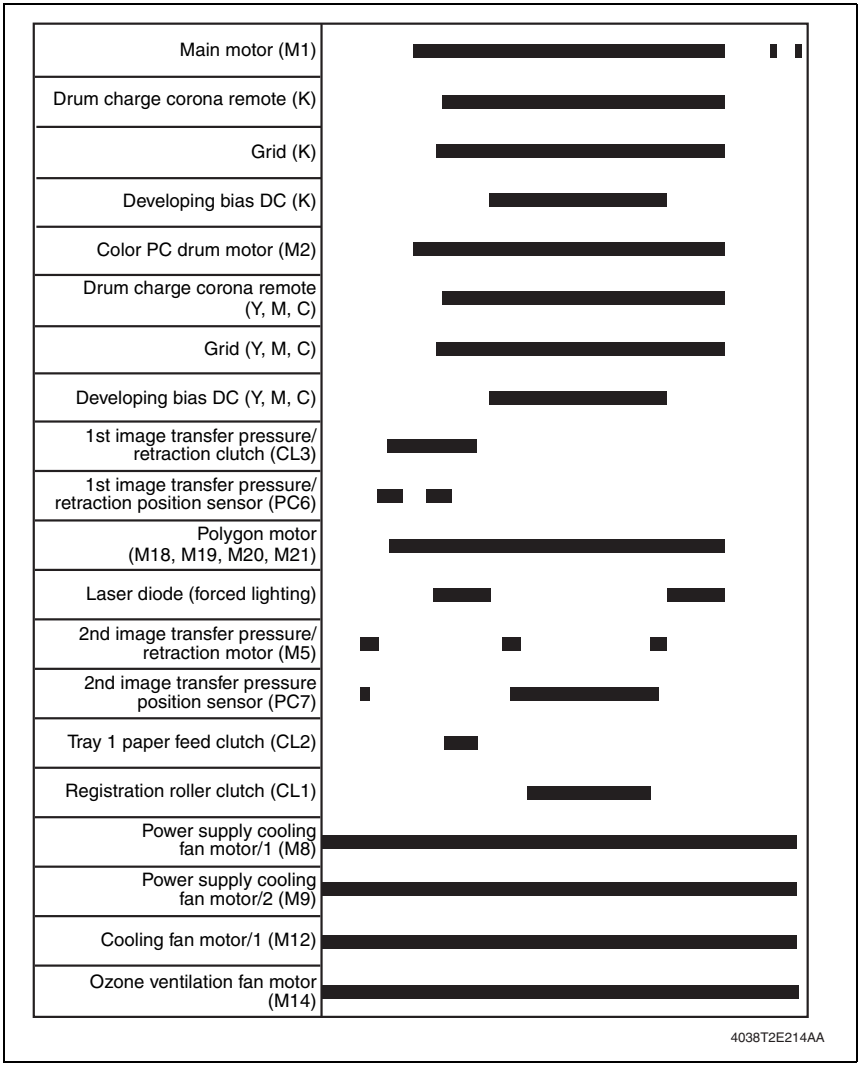
	[9]	2nd image transfer	• A DC positive voltage is applied to the backside of the paper, thereby allowing the visible, developed image on the surface of the transfer belt to be transferred onto the paper.
	[10]	Paper separation	• The paper, which has undergone the 2nd image transfer process, is neutralized so that it can be properly separated from the transfer belt by the paper separator claws.
⚠1	[11]	Transfer belt cleaning	• Residual toner on the surface of the transfer belt is collected for cleaning by cleaning blade.
	[12]	PC drum cleaning	• The residual toner left on the surface of the PC drum is scraped off.
	[13]	Main erase	• The surface of the PC drum is irradiated with light, which neutralizes any surface potential remaining on the surface of the PC drum.

Blank Page

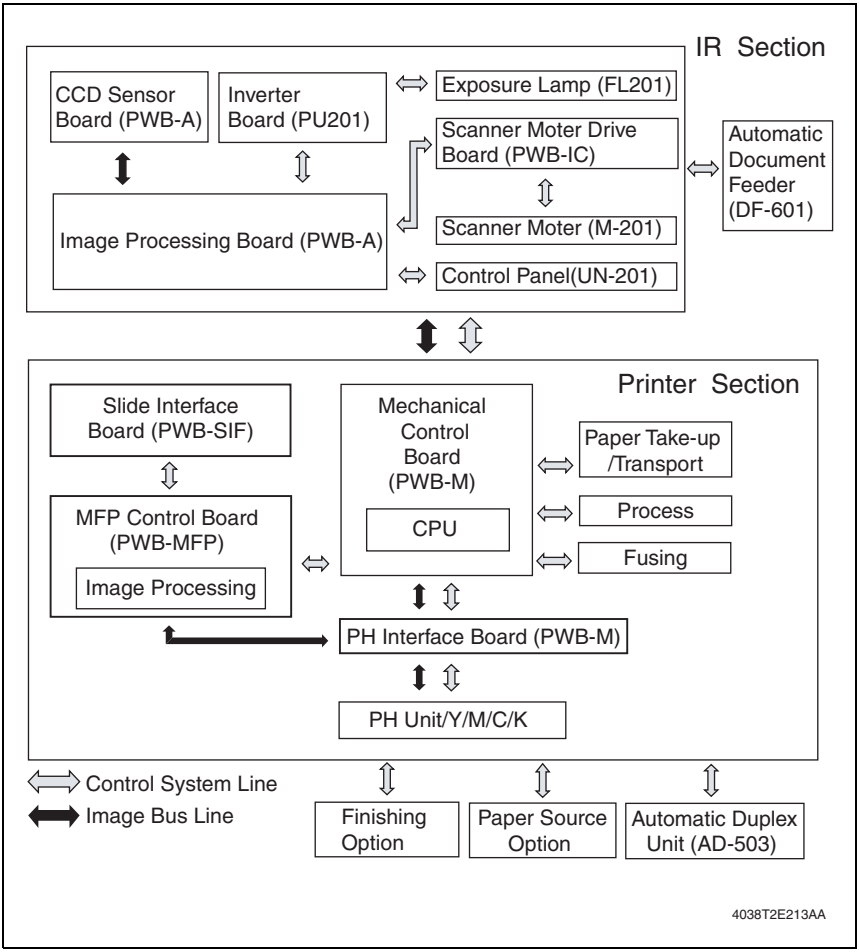
Composition/operation

6. Overall composition

6.1 Timing chart at machine power up

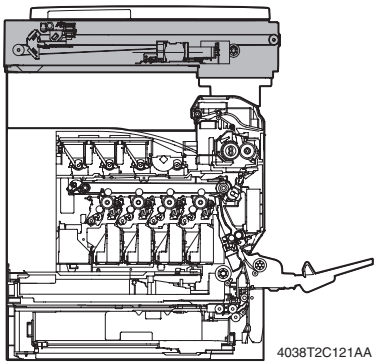

Main motor (M1)
Drum charge corona remote (K)
Grid (K)
Developing bias DC (K)
Color PC drum motor (M2)
Drum charge corona remote (Y, M, C)
Grid (Y, M, C)
Developing bias DC (Y, M, C)
1st image transfer pressure/ retraction clutch (CL3)
1st image transfer pressure/ retraction position sensor (PC6)
Polygon motor (M18, M19, M20, M21)
Laser diode (forced lighting)
2nd image transfer pressure/ retraction motor (M5)
2nd image transfer pressure position sensor (PC7)
Tray 1 paper feed clutch (CL2)
Registration roller clutch (CL1)
Power supply cooling fan motor/1 (M8)
Power supply cooling fan motor/2 (M9)
Cooling fan motor/1 (M12)
Ozone ventilation fan motor (M14)
4038T2E214AA

6.2 Control block diagram

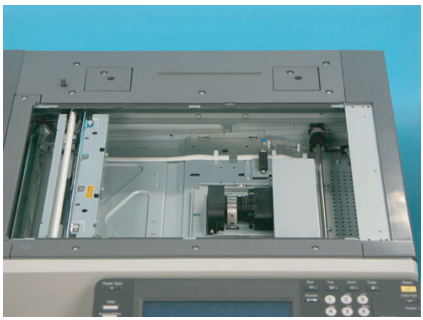


7. Scanner section (IR section)

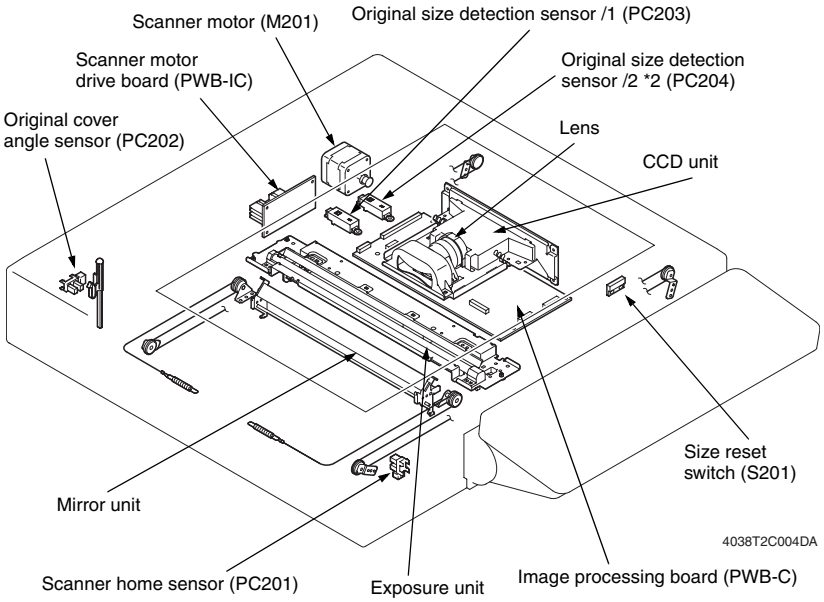
7.1 Composition



4038T2C121AA

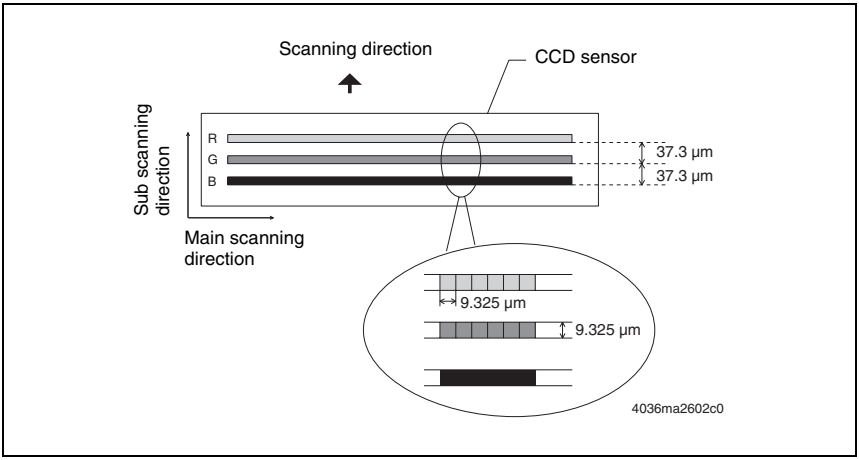


4038T2C103AA

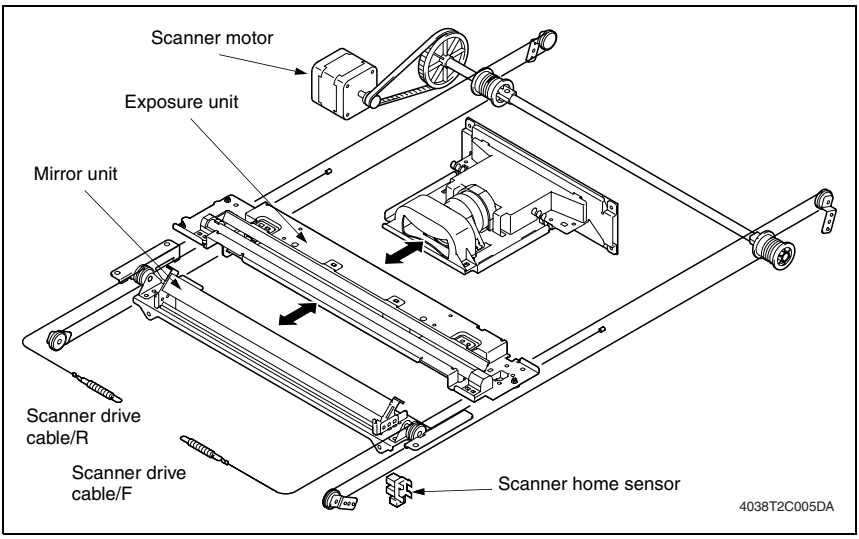


*2: Europe, China, Central America (220-240V Areas), North America only.
Countries other than the above-mentioned are standard settings

7.1.1 CCD unit



7.2 Drive



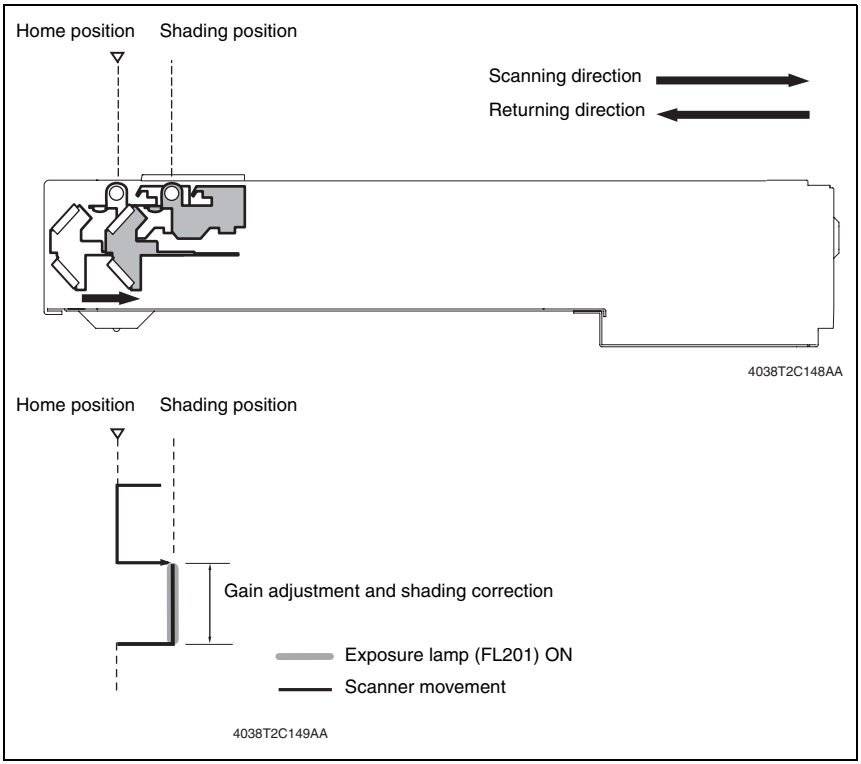
7.3 Operation

7.3.1 Scan and exposure lamp control

A. When the power is ON

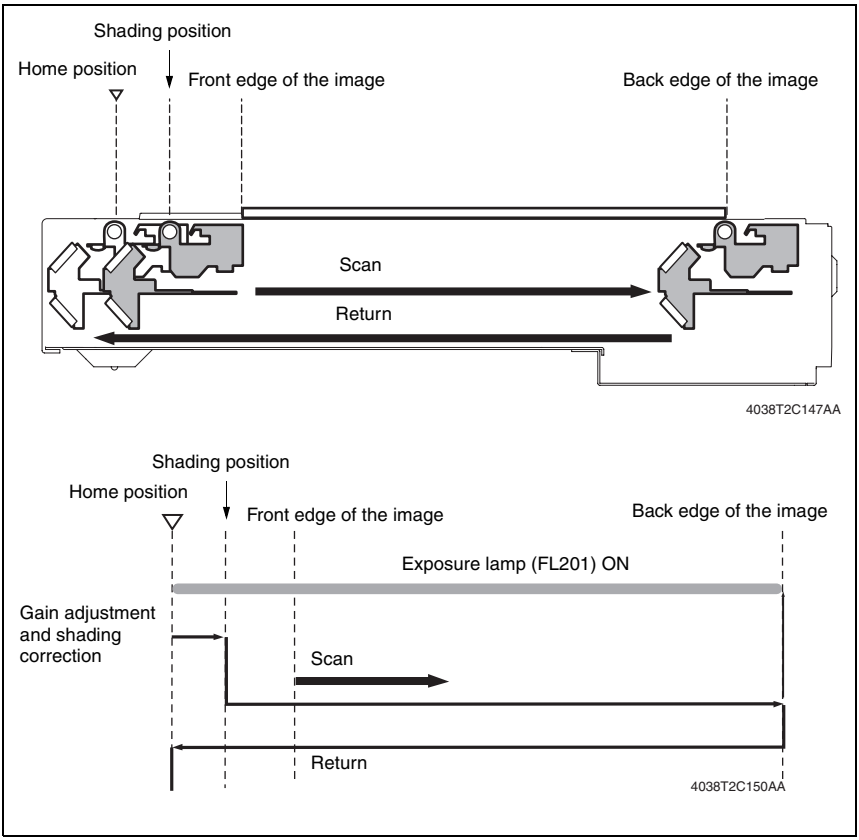
1. Exposure unit moves from the home position to the shading position (under the shading correction sheet) and stops (in scanning direction.)
2. The gain value of the CCD sensor output voltage is adjusted for R, G, and B.
3. A shading correction is made.
4. When the adjustment is complete, the exposure unit moves from the shading position to the home position and stops (in returning direction.)

* The same operation is performed for the auto and manual exposure control.



B. When the start key is pressed

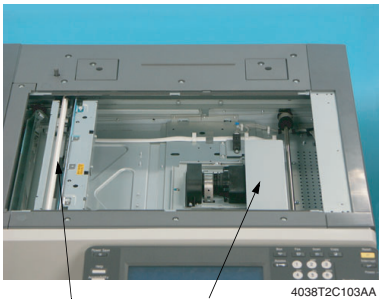
1. Turning the start key ON will turn the exposure lamp ON (at the front edge of the image.)
   The scanner cooling fan motor (M202) will rotate.
2. The exposure unit will move from the home position to the shading position in scanning direction.
   Gain as well as shading will be adjusted at the shading position.
3. The exposure unit will move from the shading position to the front edge of the image in scanning direction.
4. The exposure unit will move from the front edge to the back edge of the image to scan.
   The exposure unit will start reading the original image from the front edge.
   The unit will finish reading the image at the back edge of the image.
5. The exposure lamp will be OFF when the reading is complete.
   The scanner cooling fan motor (M202) will stop.
6. The exposure unit moves from the back-edge of the image to the home position and stops (in returning direction.)
   It scans only once even for the multi-copies, since R, G, and B data will all be memorized in one scanning.

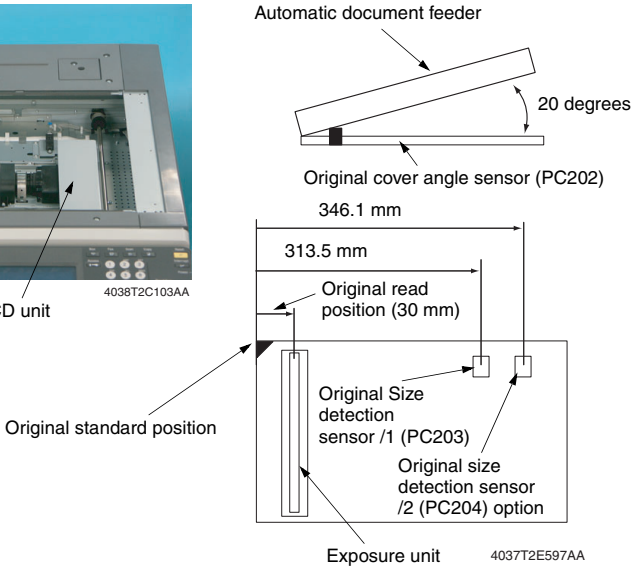


7.3.2 Original size detection control

A. Detection method

- For detection of the original size, the reflective size sensors detect the length of the original while the CCD detects the width of the original.
- Mounting the optional sensor on a machine intended for the metric areas permits detection of inch sizes. Mounting the optional sensor on a machine intended for the inch areas permits detection of metric sizes.





- With RGB image processing board (PWB-C), the original size will be judged by the original size sensor and CCD.
- An original of an irregular size is rounded to the nearest standard size.

Metric area & China areas

Table 1

Original size detection sensor /1 (PC203)	CCD width (mm)							
	~153.0	~187.0	~200.0	~215.0	~225.0	~261.5	~275.0	278.1~
OFF	A5S	B5S	16KS	A4S	B5	B5	16k	A4
ON	-	-	-	-	FLS	B4	8k	A3

Table 2

Original size detection sensor		CCD width (mm)										
/1	/2*	~143	~153	~187	~200	~213	~220.9	~225	~261.5	~274.7	~284.4	284.5~
OFF	OFF	Invoice S	A5S	B5S	16KS	A4S	Letter S	-	B5	16K	Letter	A4
ON	OFF	-	-	-	-	FLS	FLS	FLS	-	-	-	-
OFF	ON	-	-	-	-	-	-	-	-	-	-	-
ON	ON	-	-	-	-	-	-	-	B4	8K	11×17	A3

*: Option

Inch areas

Table 1

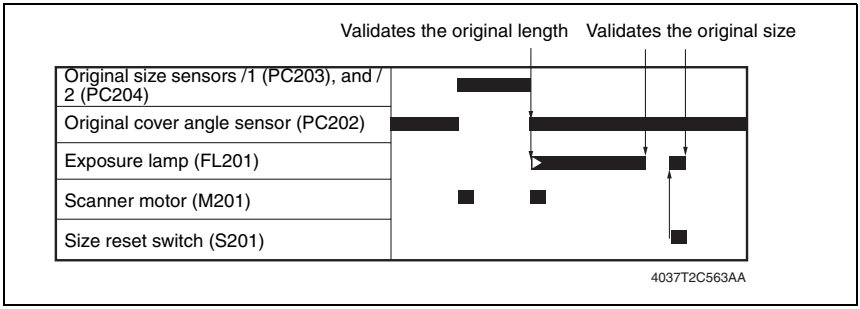
Original size detection sensor /1 (PC203)	CCD width (mm)		
	~144.7	~220.9	~221.0
OFF	Invoice S	Letter S	Letter
ON	-	Legal	11×17

Table 2

Original size detection sensor		CCD width (mm)								
/1	/2*	~143	~153	~187	~213	~220.9	~225	~262	~284.4	284.5~
OFF	OFF	Invoice S	A5S	B5S	A4S	Letter S	-	B5	Letter	A4
ON	OFF	-	-	-	FLS	FLS	FLS	-	-	-
OFF	ON	-	-	-	-	Legal	-	-	-	-
ON	ON	-	-	-	-	Legal	-	B4	11×17	A3

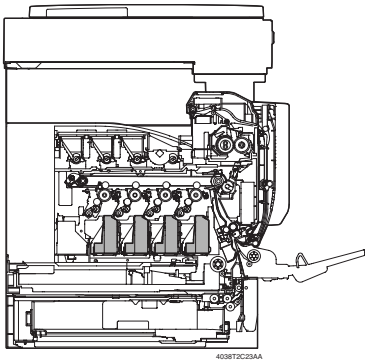
*: Option

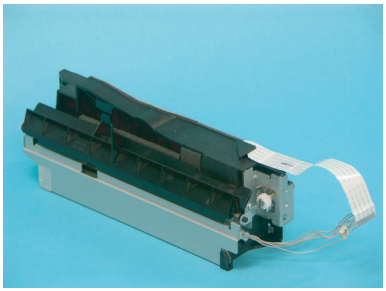
B. Detection timing


Validates the original length
Validates the original size
Original size sensors /1 (PC203), and / 2 (PC204)
Original cover angle sensor (PC202)
Exposure lamp (FL201)
Scanner motor (M201)
Size reset switch (S201)
4037T2C563AA

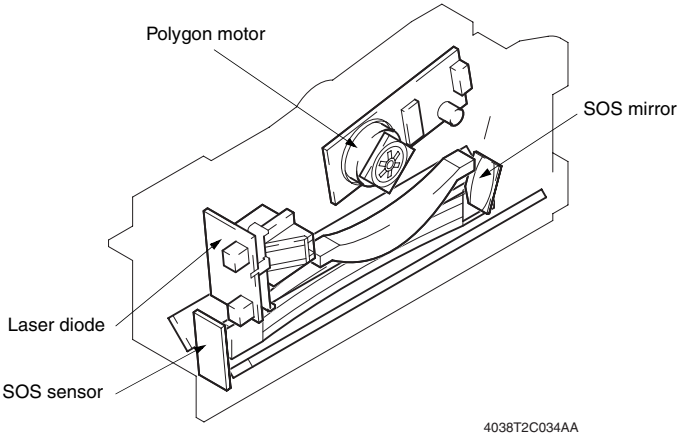
8. Write section (PH section)

8.1 Composition





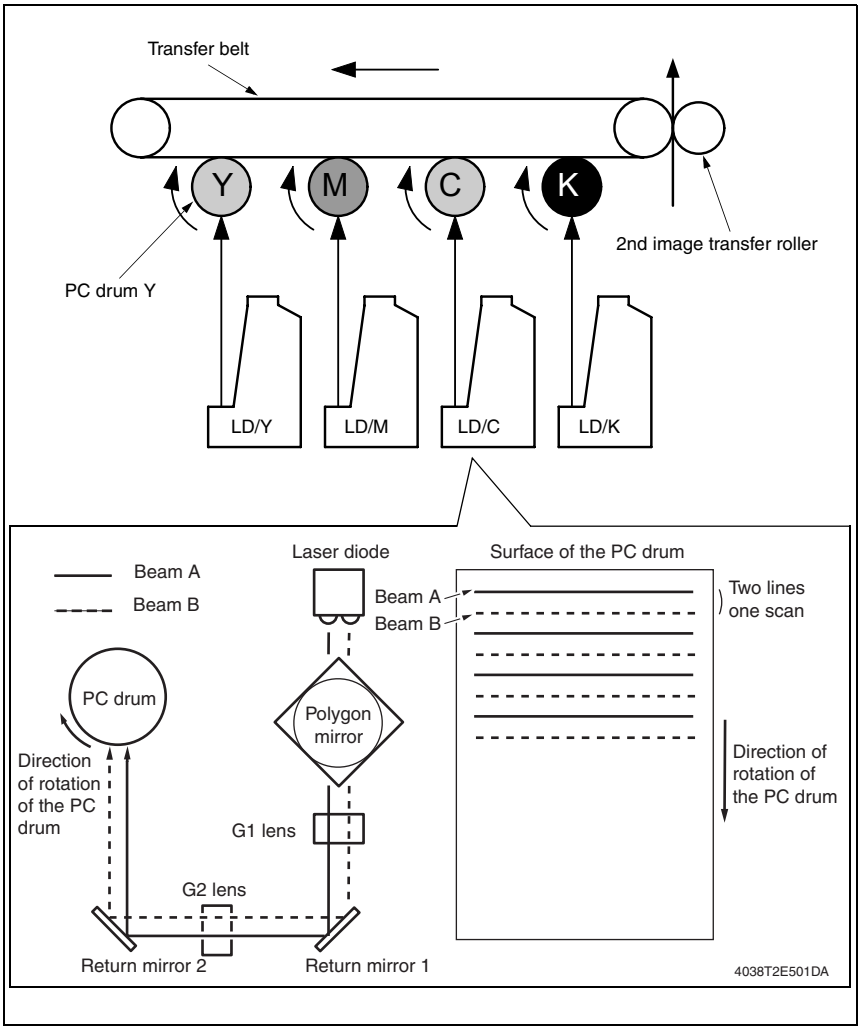
Printer head



8.2 Operation

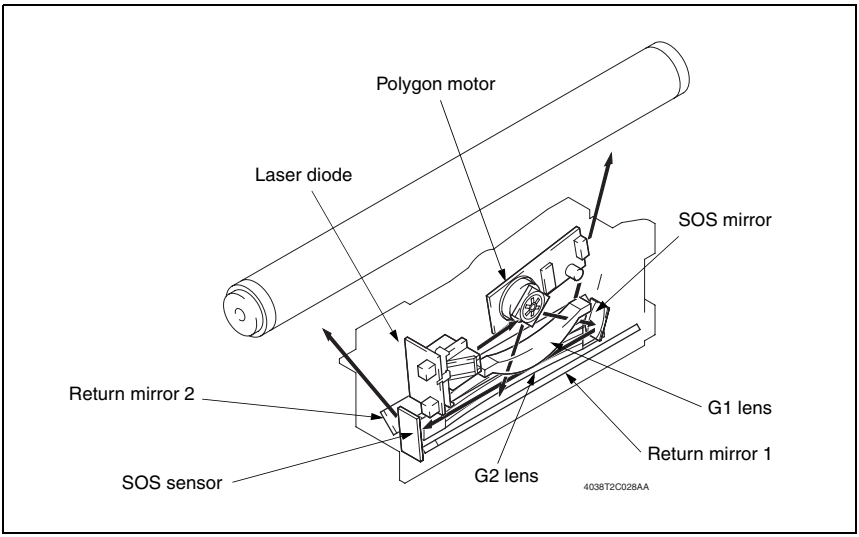
8.2.1 Outline

- 4 types of the printer head are used for exposure process.
- The surface of the photo conductor is irradiated with a laser light and an electrostatic latent image is thereby formed.
- The polygon mirror has four faces. The machine uses a two-beam array LD to inhibit the speed of the polygon mirror from increasing because of the decreased number of faces the polygon mirror has as compared with the conventional models.
- The two-beam array LD consists of two LD elements arranged vertically. Two lines are scanned with two laser beams emitted from these two LD elements through a single face of the polygon mirror.



8.2.2 Laser exposure process

1. Laser beam irradiated by the laser diode is reflected on the polygon mirror.
2. The polygon mirror is a four-faced mirror that rotates at high speed motored by the polygon motor. The polygon mirror reflects the incoming laser beam in the main scanning direction and reflects it on the G1 lens.
3. The G1 lens corrects the converging angle of the incoming laser beam and reflects it on the return mirror 1.
4. Return mirror 1 reflects the laser beam collected by the G1 lens to the G2 lens.
5. G2 lens reflects the laser beam collected by the return mirror 1 on the return mirror 2.
6. The return mirror 2 irradiates the laser beam came from G2 lens to the PC drum.

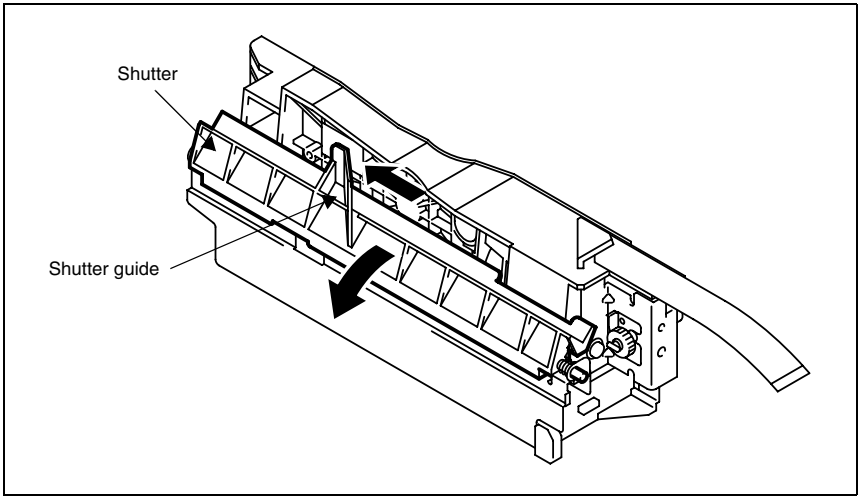


8.2.3 Laser emission timing

- When a ready signal is detected after the lapse of a given period of time after the print cycle has been started, a laser ON signal is output from the mechanical control board (PWB-M).
- The laser ON signal triggers the firing of each laser light which illuminates the SOS Board via polygon mirror and G1 lens. This generates an SOS signal.
- This SOS (start of scan) signal unifies the timing at which the laser lights are irradiated for each main scan line.

8.2.4 Laser shutter mechanism

- There is a shutter mechanism provided to prevent the PH from being contaminated with foreign matter such as dust when the front cover is opened or closed, or prevent the emission laser from leaking outside for any reason.
- The shutter opens by pressing shutter guide at insertion of the imaging unit.



8.2.5 Laser emission area

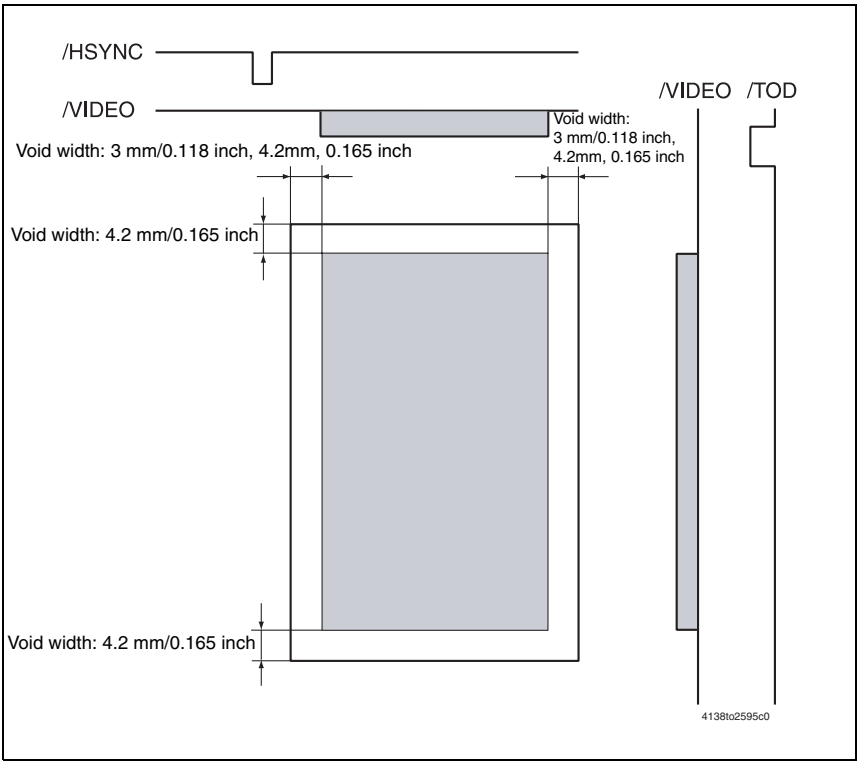
A. Main scan direction (CD)

- The print start position in the CD direction is determined by the CD print start signal (/HSYNC) that is output from the MFP control board (PWB-MFP) and the width of the paper.
- 2 The laser emission area is determined by the paper size. Both edges of the paper are, however, void image areas (3 mm/0.118 inch each in the copy and fax mode and 4.2 mm/0.165 inch each in the print mode).

B. Sub scan direction (FD)

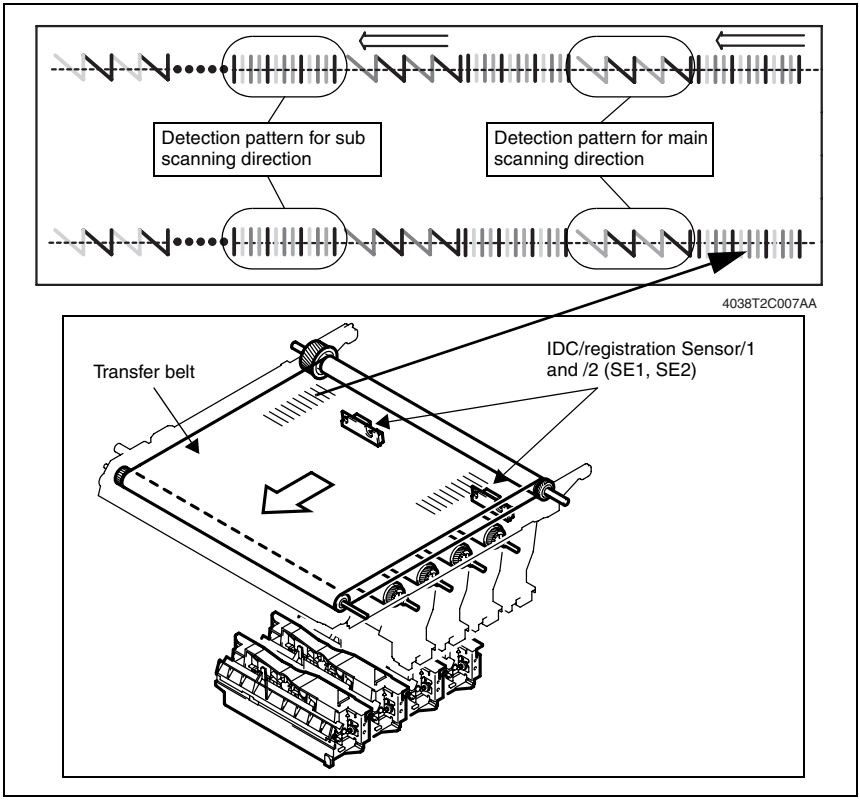
- The print start position in the FD direction is determined by the image write start signal (/TOD) that is output from the MFP control board (PWB-MFP) and the length of the paper.
- The laser emission area is determined by the paper size. The area of 4.2 mm/0.165 inch on the leading and trailing edges and 3 mm/0.118 inch on both the side edges of the paper are, however, the void image area.

2



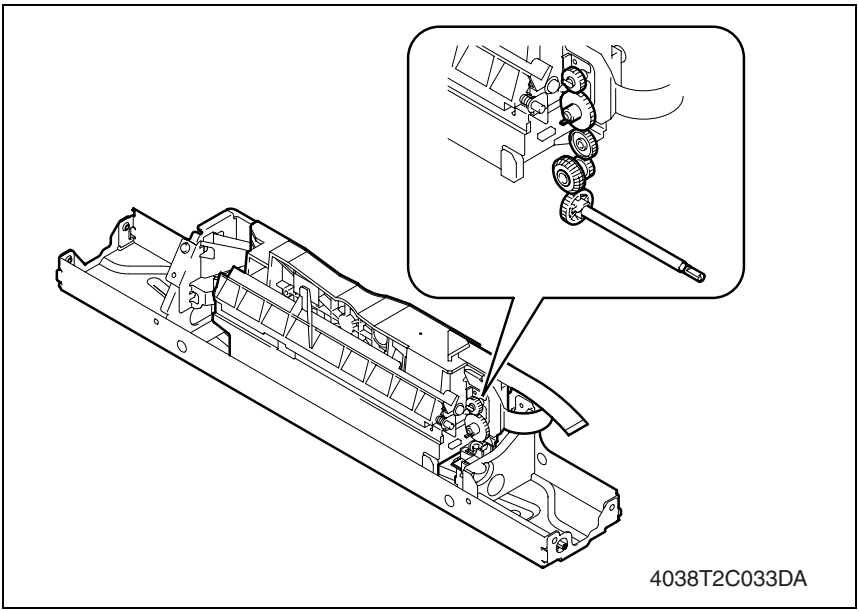
8.2.6 Registration control (color shift correction) system

- In a tandem engine, in which an independent image reproduction process is provided for each of the four different colors of toner. Incorrect color registration, or color shift, is therefore more likely to occur due to each of the PH assemblies being out of correct position. The color shift correction system automatically detects any misalignment among the different colors, correcting it both in the main scanning and sub scanning directions.
- The color shift detection sequence proceeds as follows. A detection pattern each in the main scanning direction is produced at the front and rear on the transfer belt. Each of IDC/registration sensor/1 and /2 at the front and rear reads the corresponding pattern. The amount of color shift in the sub scanning direction is then calculated and stored in memory. A detection pattern each in the sub scanning direction is next produced at the front and rear on the transfer belt. Each of IDC/registration sensor/1 and /2 at the front and rear reads the corresponding pattern. The amount of color shift in the main scanning direction is then calculated and stored in memory. Based on the data representing the amounts of color shift, the machine calculates how much each of the different colors should be corrected. The correction data is further stored in memory. Based on the data stored in memory, the machine controls each dot during production of image outputs, thereby correcting the color shift (varying the timing at which the LD is turned ON).
- ⚠2 The color shift correction is made when the right door is opened and closed, the transfer Belt is removed and reinstalled, the IU is removed and reinstalled, the main power switch is turned OFF and ON, or an image stabilization sequence is carried out from the control panel.

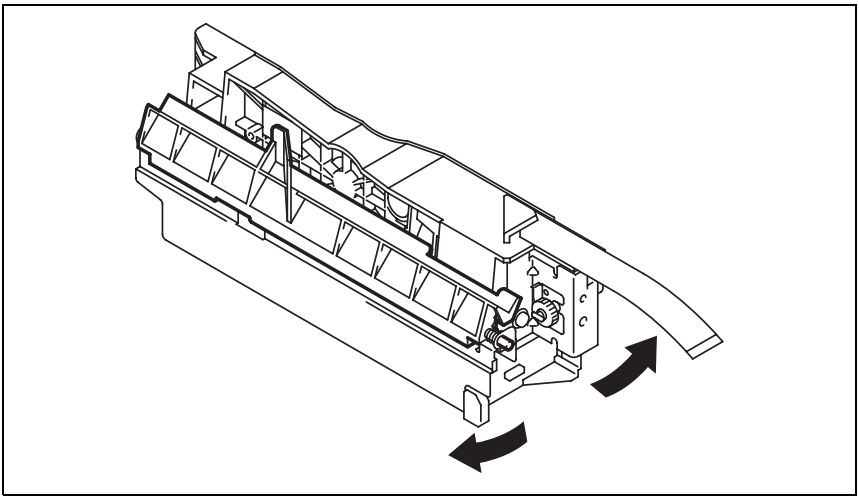

Detection pattern for sub scanning direction
Detection pattern for main scanning direction
4038T2C007AA
Transfer belt
IDC/registration Sensor/1 and /2 (SE1, SE2)

8.2.7 Skew control mechanism

- When the printer head is mounted on the main body installation plate, image distortion (skew) occurs due to mounting error. Therefore the printer head adopts the correction system.

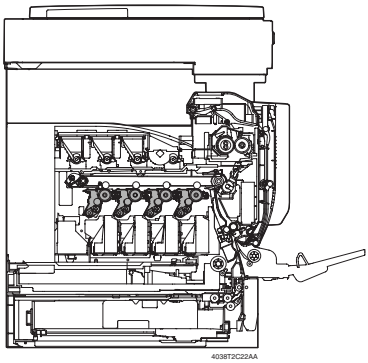


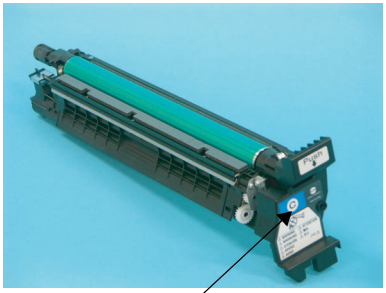
- The main body skew can be corrected by adjusting the dial of the corresponding printer head (Y, M, C, K.)

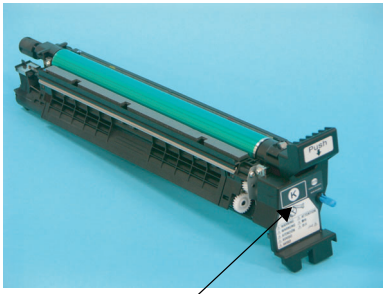


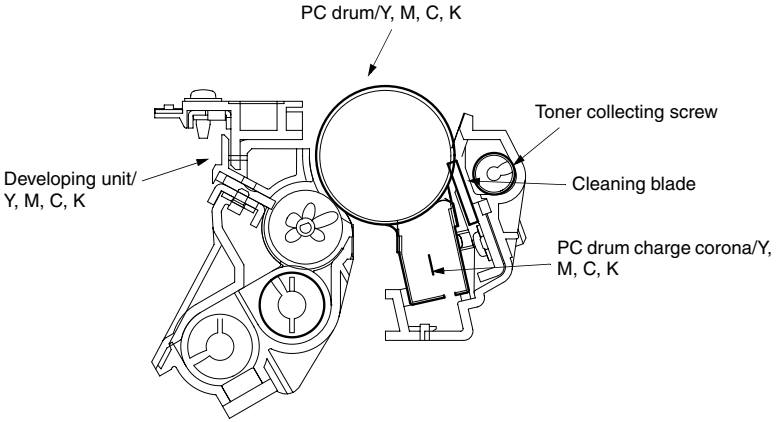
9. Imaging unit section (IU section)

9.1 Composition

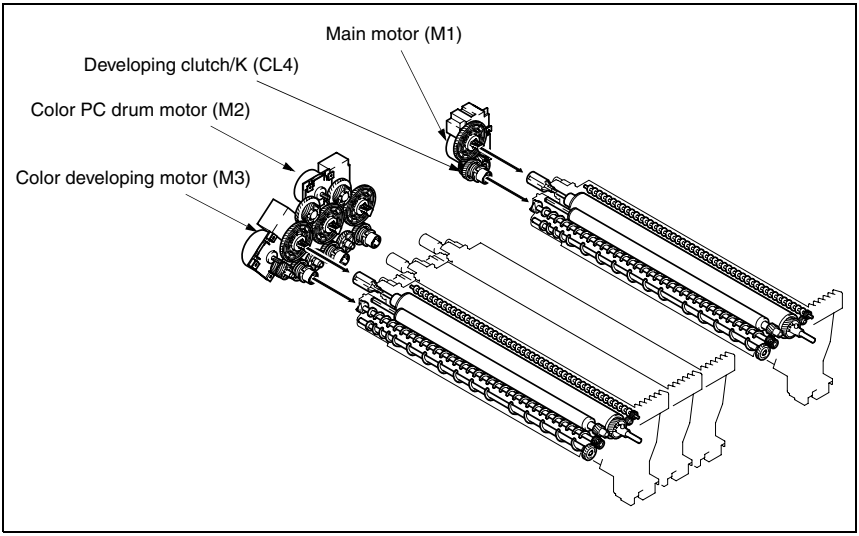








9.2 Drive


Main motor (M1)
Developing clutch/K (CL4)
Color PC drum motor (M2)
Color developing motor (M3)

9.3 Operation

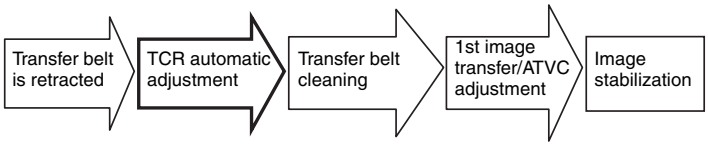
9.3.1 IU life control

- Each IU has EEPROM board that detects a new IU and keeps track of the service life of the IU.

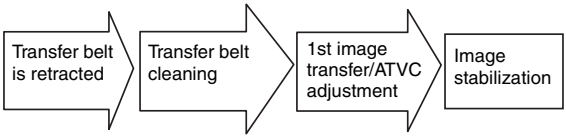
A. New IU detection

- New IU is detected when 24 V is turned ON as the main power switch is turned OFF and ON or the front door is opened and closed.
- When a new IU is detected, an TCR adjustment sequence is carried out.

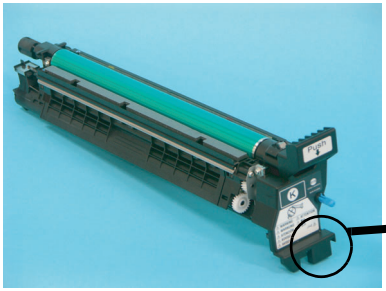
Operation when a new IU is detected



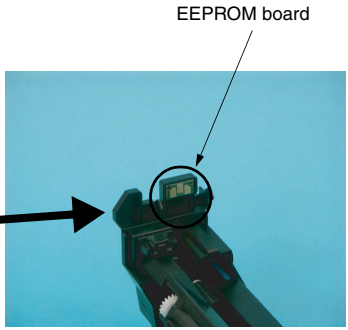
Operation when a new IU is not detected



4036ma2133c0



4038T2C009AA

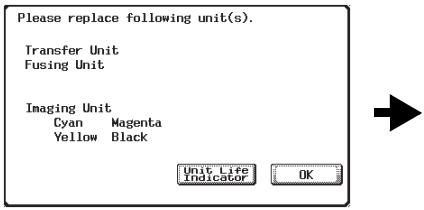


4038T2C012AA

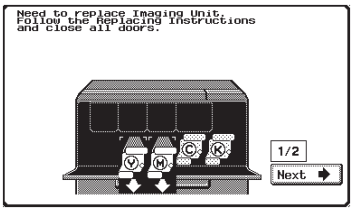
B. When life is reached

- The IU life counter is used to keep track of IU life.
- When the life value is reached, a warning message is given on the screen. When a predetermined number of printed pages are produced after the life value has been reached, the machine inhibits the initiation of a new print cycle with a message prompting the user to replace the IU given on the screen.

When a life value is reached **At print stop**



4038T2E504DA

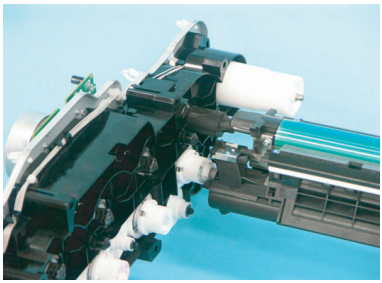


4038T2E505DA

- The warning screen and IU replacement screen change when the settings are changed for “display PM parts lifetime” and “unit change” available from the tech. rep. mode and “IU life stop setting” available from the security mode.

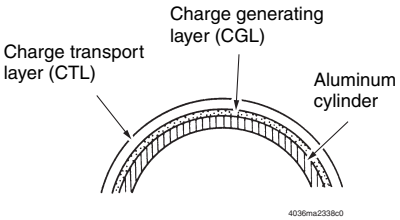
10. Photo conductor section

10.1 Composition

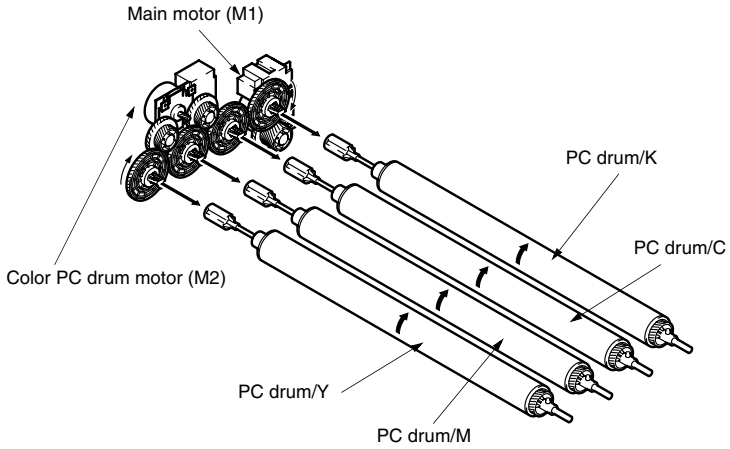


4038T2C013AA

PC drum



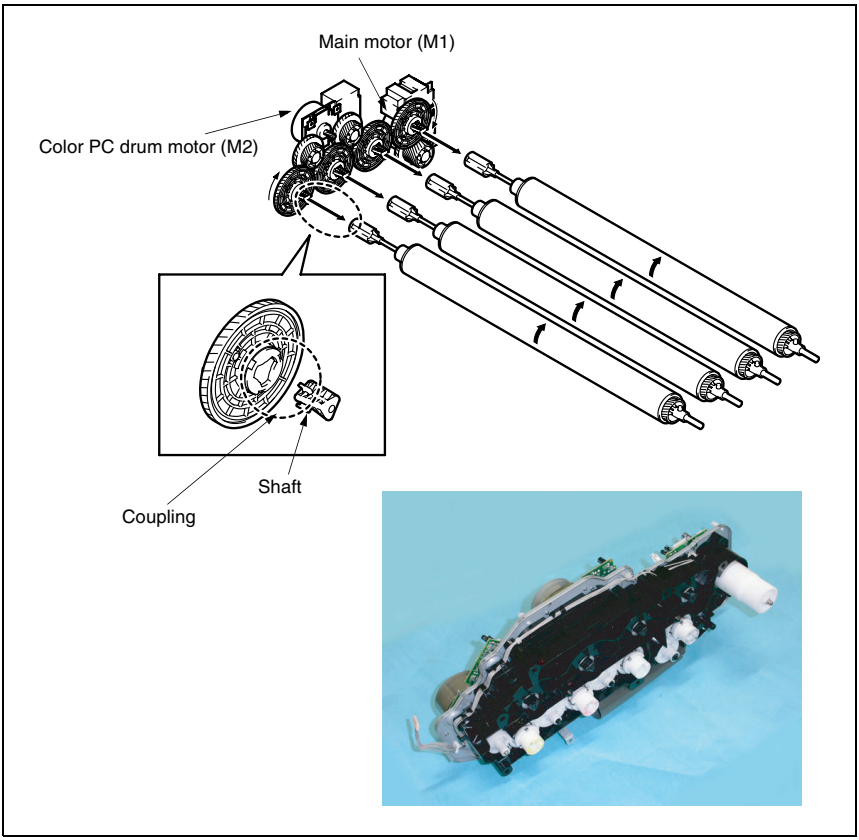
10.2 Drive



10.3 Operation

10.3.1 PC drum drive mechanism

- Two independent PC drum motors (for color and monochrome) are used for the drive mechanism to suppress incorrect color registration and uneven pitch.
- The color PC drum motor drives the PC drums/Y, M, and C, while the main motor drives the PC drum/K.
- Drive is transmitted to each of the PC drums when the triangular-prism-shaped shaft is engaged with the mating coupling part.



10.3.2 PC drum phase control

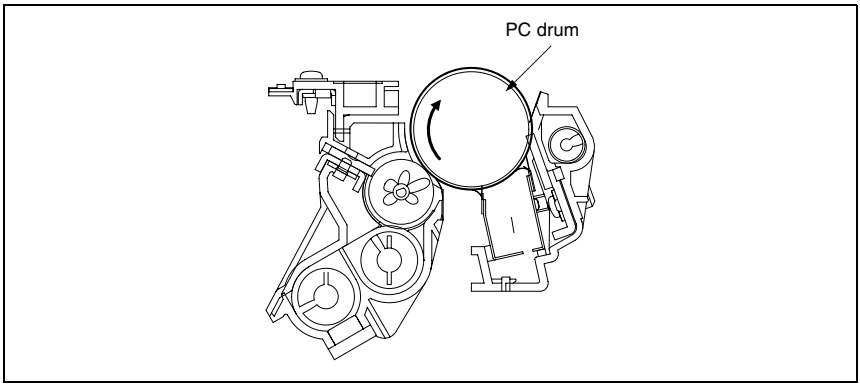
- Uneven eccentricity of the gears, a drive source of PC drums, causes unstable rotation of the coupled PC drums. For phases control of PC drums, when the PC drums start rotating, change the rise timing between the color developing motor and the main motor to adjust phase between both.

10.3.3 PC drum small amount rotation control

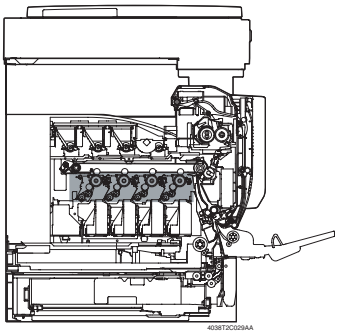
- Humidity around the IU can produce a difference in sensitivity among different PC drums. This could lead to drum memory, allowing black bands to occur in the image. In addition, ozone stagnant in areas near the PC drum charge corona reduces sensitivity of the PC drums, causing white bands to occur in the image.
- To prevent these image problems, that the PC drum is turned at regular intervals to keep the surface sensitivity uniform as temperature and humidity change.

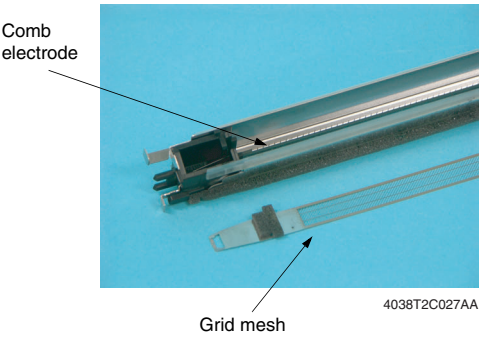
A. PC drum small amount rotation timing

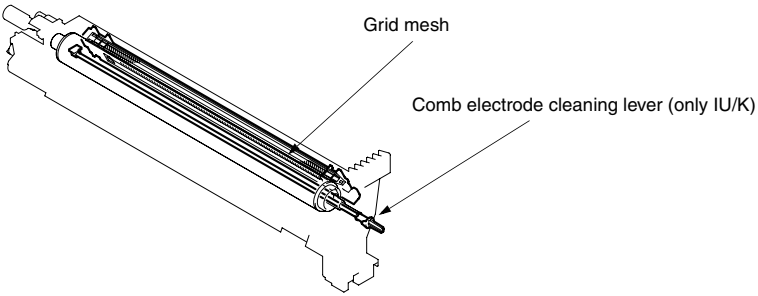
- When ten or more are printed by the accumulation, this operation is made during the waiting after completion of printing operation.
- Small amount rotation time changes according to accumulated time of the PC drum rotation and interior temperature.

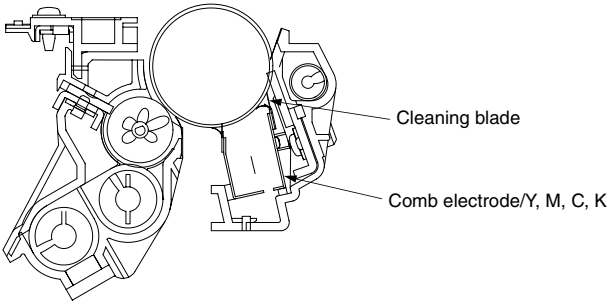


11. Charge corona section





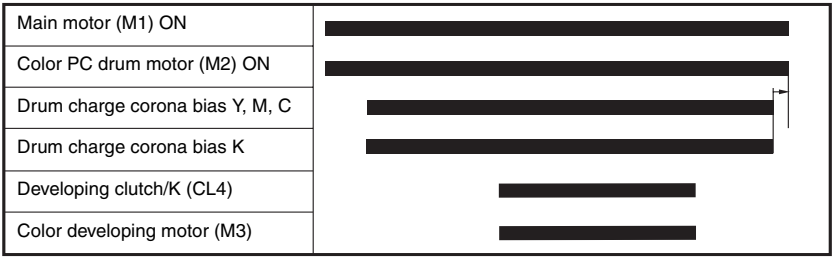




11.1 Operation

11.1.1 PC drum charge corona ON/OFF control

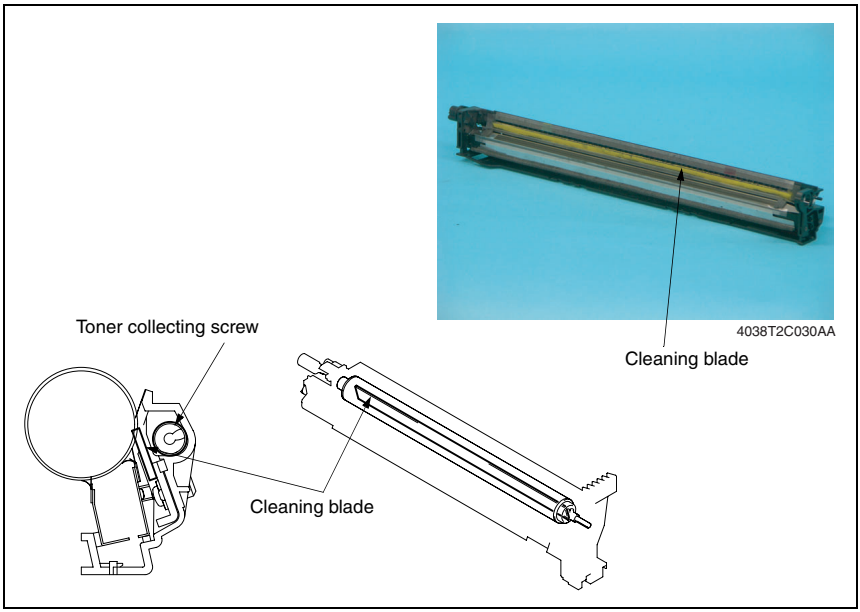
- The grid voltage (Vg) applied to the grid mesh is controlled through the image stabilization control.


Main motor (M1) ON
Color PC drum motor (M2) ON
Drum charge corona bias Y, M, C
Drum charge corona bias K
Developing clutch/K (CL4)
Color developing motor (M3)
4038T2C024AA

11.1.2 Cleaning/main erase mechanism

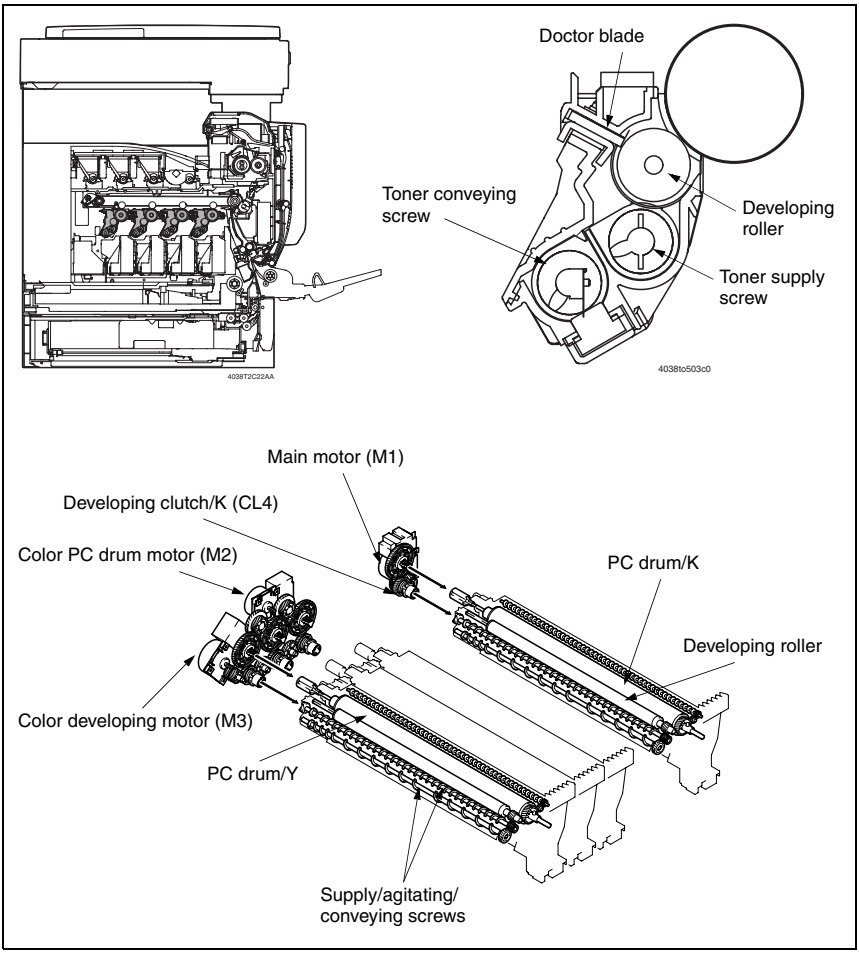
A. Cleaning/main erase operation

1. The cleaning blade is pressed up against the surface of the PC drum, scraping residual toner off the surface (forward blade system).
2. Toner, which has been scraped off the surface of the PC drum, is fed by the toner collecting screw back toward to the conveying screw in the rear of the machine. It is then collected in the waste toner collecting box.
3. The surface of the PC drum after the image transfer process is irradiated with light from the main erase lamp. This neutralizes any potential left on the surface of the PC drum.

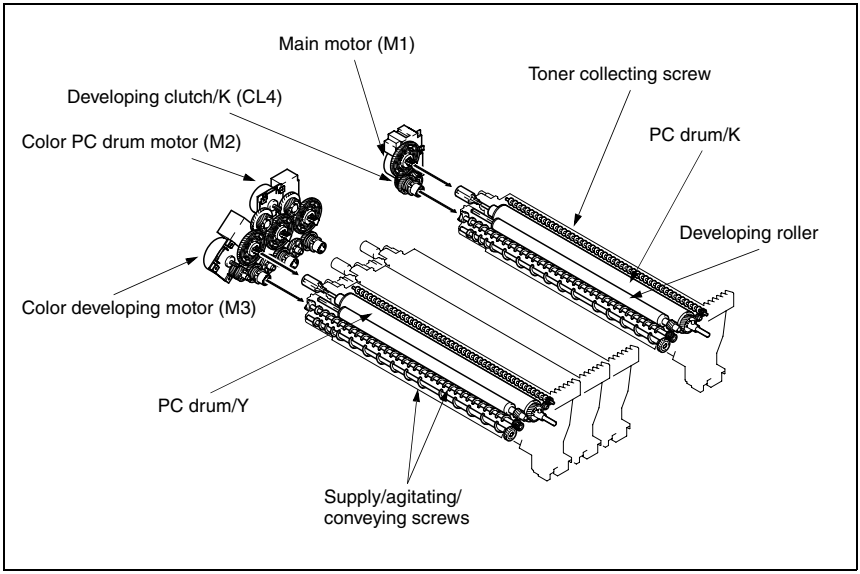


12. Developing section

12.1 Composition

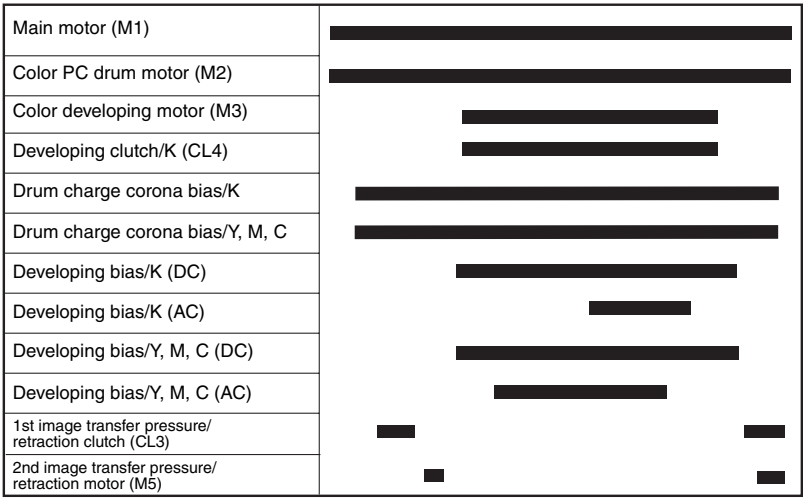


12.2 Drive


Main motor (M1)
Toner collecting screw
Developing clutch/K (CL4)
PC drum/K
Color PC drum motor (M2)
Developing roller
Color developing motor (M3)
PC drum/Y
Supply/agitating/
conveying screws

12.3 Operation

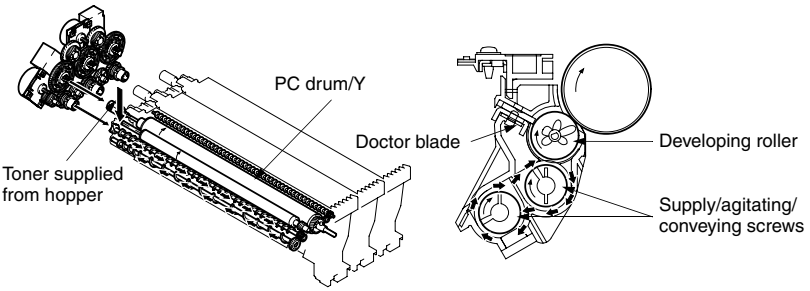
12.3.1 Developing drive control


Main motor (M1)
Color PC drum motor (M2)
Color developing motor (M3)
Developing clutch/K (CL4)
Drum charge corona bias/K
Drum charge corona bias/Y, M, C
Developing bias/K (DC)
Developing bias/K (AC)
Developing bias/Y, M, C (DC)
Developing bias/Y, M, C (AC)
1st image transfer pressure/ retraction clutch (CL3)
2nd image transfer pressure/ retraction motor (M5)
4038T2C025AA

12.3.2 Developer flow

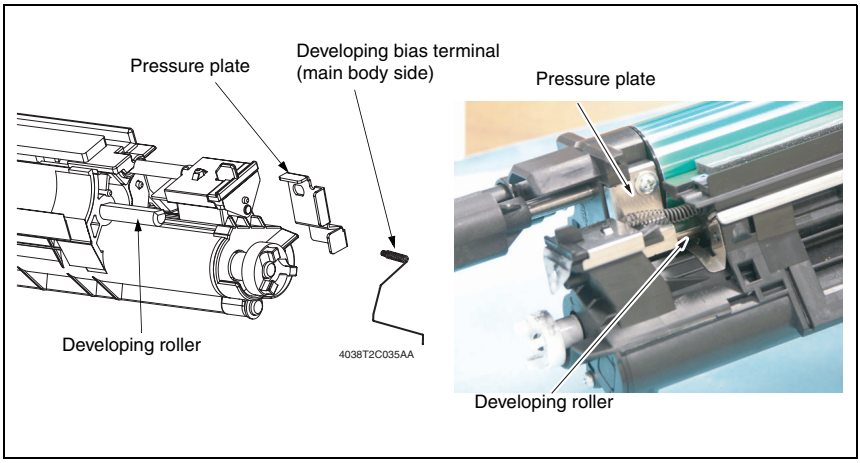
1. Toner supplied from the rear end of the developing unit is fed to the lower screw. It is then fed to the front of the unit, while being mixed with developer and electrically charged by the supply/agitating/conveying screws.
2. The TCR sensor installed on the underside of the developing unit detects toner-to-carrier ratio during this time.
3. The developer, fed to the front of the developing unit, is conveyed further to the upper screw.
4. The developer is conveyed onto the developing roller. The doctor blade then controls the height of the developer brush to ensure that the developer on the developing roller levels out.
5. The toner sticks to the electrostatic latent image on the surface of the PC drum. The developer that is left on the sleeve is returned to the lower screw by the magnetic pole positioning of the developing roller. It is then conveyed to the rear side of the imaging unit.

For IU/Y



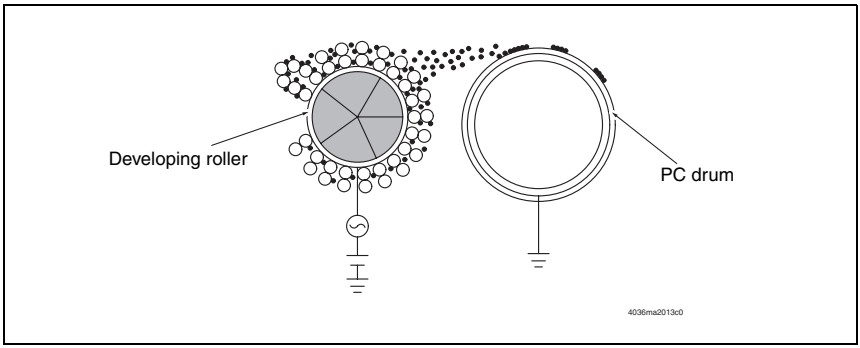
12.3.3 Developing bias

- The developing bias voltage (Vdc) is applied to the developing roller so that an adequate amount of toner is attracted onto the surface of the PC drum.
- In addition to the negative DC component, AC voltage is applied during development to help toner to be attracted more easily to the surface of the PC drum. This AC component is applied only while development is taking place. At any other timing, only the DC(-) Vdc is applied.
- The developing bias (Vdc) is supplied from high voltage unit (HV1).



12.3.4 HMT (high grade micro toning) development

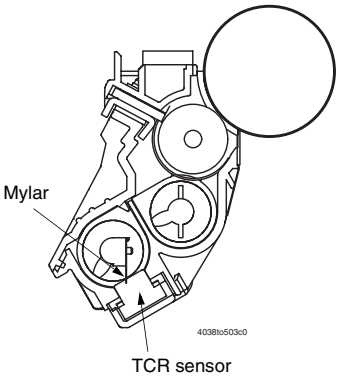
- The machine employs the two-component non-contact development system.
- With the HMT method, the magnetic developer brush does not rub against the surface of the PC drum (the images). Accordingly, sharper line images can be reproduced, involving no uneven image density at the trailing edge or thin lines and achieving even finer reproduction of the solid image areas.

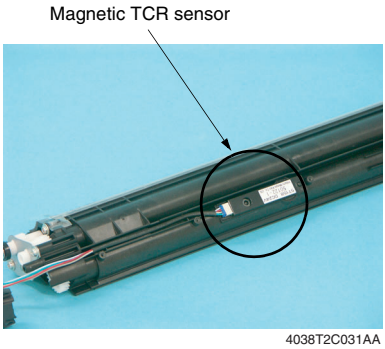


12.3.5 TCR sensor control

- The TCR sensor is mounted on the underside of each of the developing sections. The sensor for C, M, Y and K is a magnetic type. Each of these sensors detects toner-to-carrier ratio (T/C) of the developer. The reading is used for determining the amount of toner supplied.
- Only when a new imaging unit is installed in the machine, an automatic adjustment is made of each of these TCR sensors. The sensors cannot be adjusted manually.
- The target T/C is 8% for color and 7% for K.
- The magnetic permeability (powder density) of the carrier in the developer is measured to determine the T/C.
- A mylar is provided for the conveying screw portion to scrape toner off the surface of the TCR sensor.
- The TCR sensor is integrated with the imaging unit. When the TCR sensor is to be replaced with a new one, the entire imaging unit must be replaced.

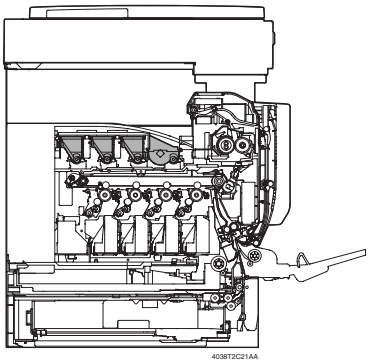
TCR sensor

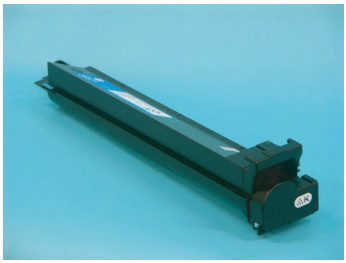




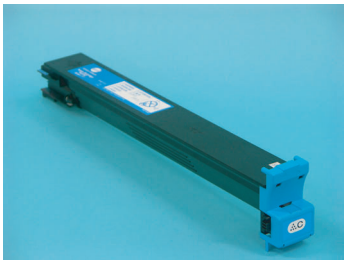
13. Toner supply section

13.1 Composition

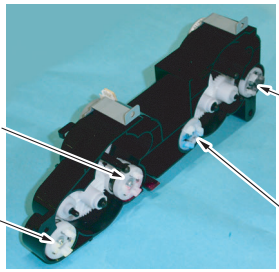


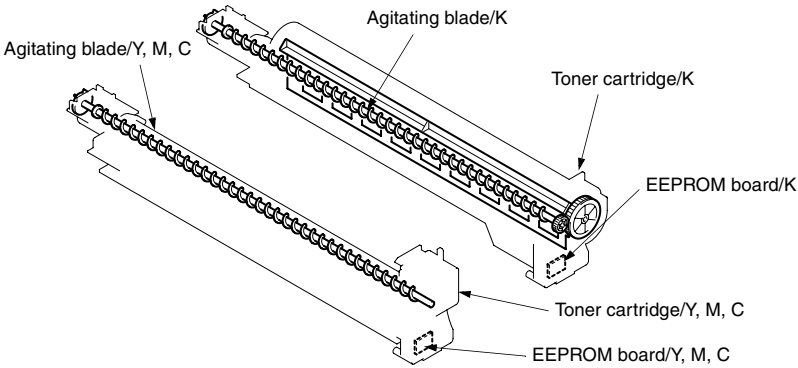


Toner cartridge/K

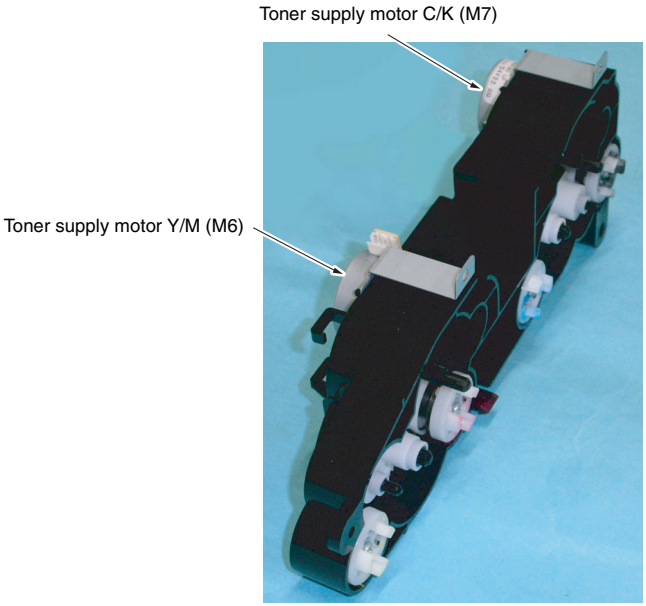


Toner cartridge/Y, M, C





13.2 Drive



13.3 Operation

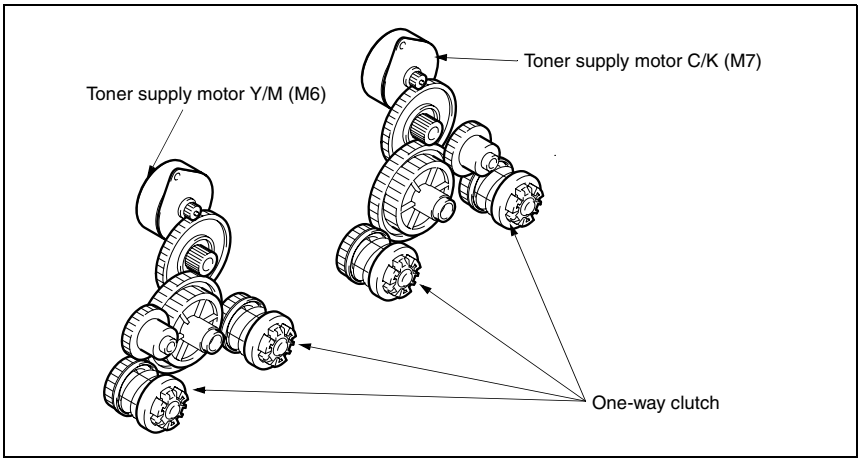
13.3.1 Toner replenishing mechanism/control

A. Toner replenishing mechanism

- A single toner supply motor is turned either forward or backward to supply toner of two different colors (toner supply motor for K and C, and toner supply motor for Y and M).

Toner supply motor C/K (M7)	K toner	C toner
Turned forward	Energized	Deenergized
Turned backward	Deenergized	Energized

Toner supply motor Y/M (M6)	Y toner	M toner
Turned forward	Energized	Deenergized
Turned backward	Deenergized	Energized



- Replenishing operation
  1. Drive of the toner supply motor is transmitted through a gear train to the drive gears of the toner cartridges of two colors. A one-way clutch is used for each of these drive gears, meaning that the drive gear turns in one direction only. Either one of these two drive gears is turned according to whether the toner supply motor turns forward or backward.
  2. As the drive gear turns, the screw installed inside the toner cartridge rotates to transfer the toner to the toner cartridges replenishing port. Then the toner goes through the carrier pipe of the main body and drops into the imaging unit port to replenish the supply of toner to the imaging unit.

B. Toner replenishing control

- T/C is detected when the developing clutch/K (CL4) is energized for K or when the color developing motor (M3) is energized for C, M, and Y.
- Based on T/C ratio detected by the TRC sensor and amount of consumption calculated by the dot counter, toner replenishing time (amount) is determined.
- When the machine determines the toner replenishing, sometime it detects the toner amount that surpasses the maximum volume for one replenishing control. If it is not possible to replenish the supply of the required amount of toner within this maximum replenishing time, the reminder time is stored in memory and added to the replenishing time for the next replenishing sequence.

13.3.2 Toner cartridge life control

A. Toner cartridge detection/new unit detection timing

- detection is controlled by confirming the data of each unit with access to TC EEPROM board when the front door is closed.
- Based on the data, the machine confirms if the cartridge is mounted or not.
- After detecting the presence of the cartridge, with the data machine checks if the cartridge is new or not.

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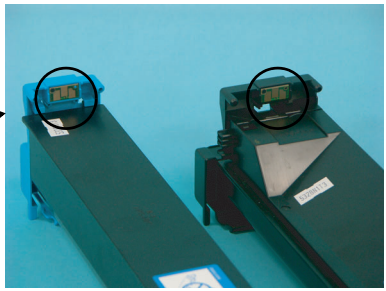

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B. Toner empty detection control

- A toner empty condition can be divided into 3 groups: normal, near-empty, empty
- Normal: Available number of copy is 1K or more.
- Near-empty: Available number of copy is under 1K.
- Empty: Toner remaining level is 0.

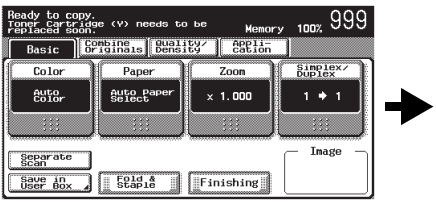
C. Toner near-empty detection control

- When new toner is set, toner remaining level is set to TC EEPROM board. Based on the remaining level, the machine calculates and gives subtraction of the toner replenishing amount from the hours which the toner replenishing motor has turned. When the level reaches the given amount of toner remaining, toner near-empty warning is displayed.

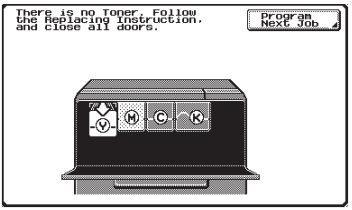
D. Toner empty control

- After a near-empty condition is detected, the toner density detected by the TCR sensor, at every T/C ratio detection timing, is compared with the target toner density to calculate the density difference. The count number defined according to each density difference is added, and when the value reaches the given level, toner empty warning is displayed.

Toner near-empty **Toner empty (user)**



4038T2E506DA



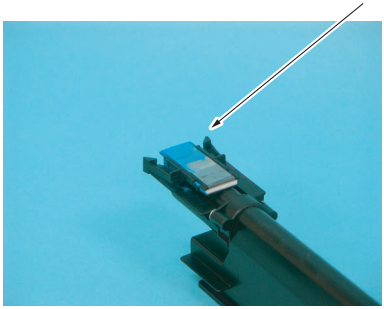
4038T2E507DA

- A different toner empty screen is displayed if “user” is selected for “unit change” available from the tech. rep. mode.

13.3.3 Shutter mechanism

- To prevent toner from being spilled when the toner cartridge is removed from the machine, there is a shutter mechanism provided. When the toner cartridge is installed in the machine, the shutter opens.
- Put the replacement port face down to keep the cover close.

Before toner cartridge is installed



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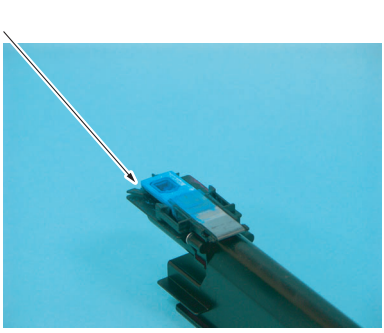
When toner cartridge is installed

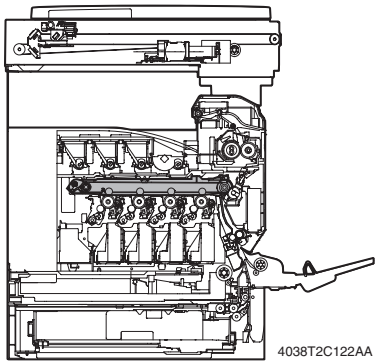


4038T2C019AA

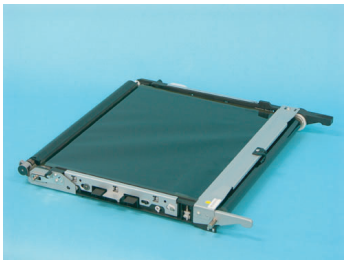
14. Transfer corona section

14.1 Composition

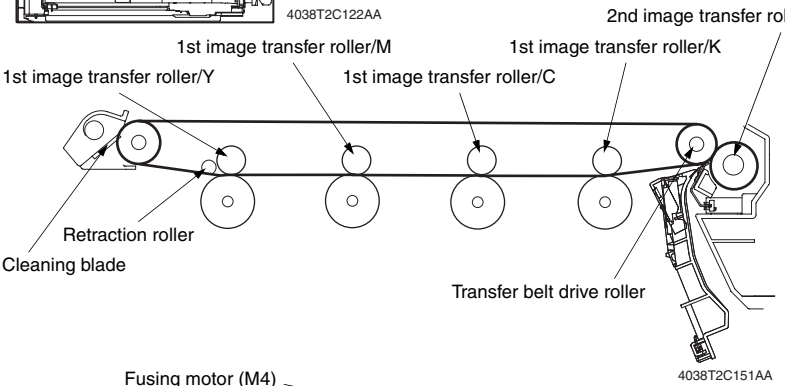
14.1.1 1st image transfer section



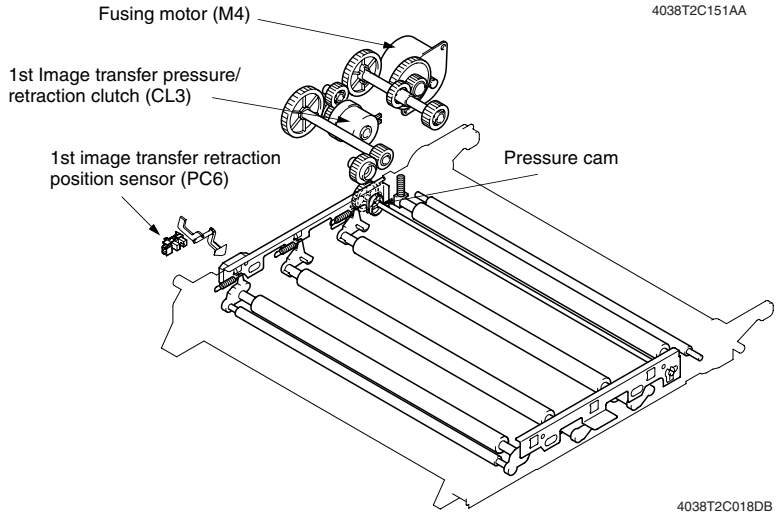
4038T2C122AA



4038T2C105AA

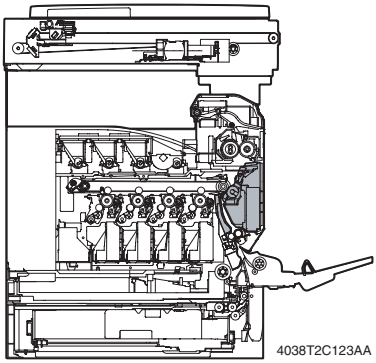


4038T2C151AA

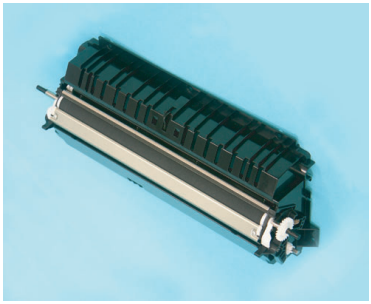


4038T2C018DB

14.1.2 2nd image transfer section



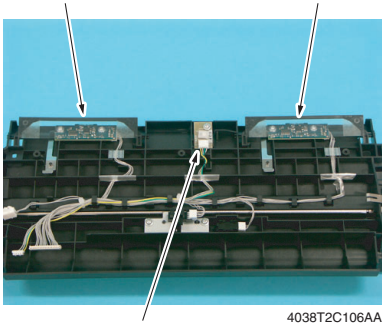
4038T2C123AA



4038T2C117AA

IDC/registration sensor /2 (SE2)

IDC/registration sensor /1 (SE1)

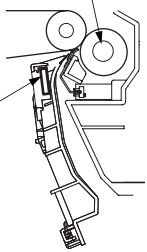


4038T2C106AA

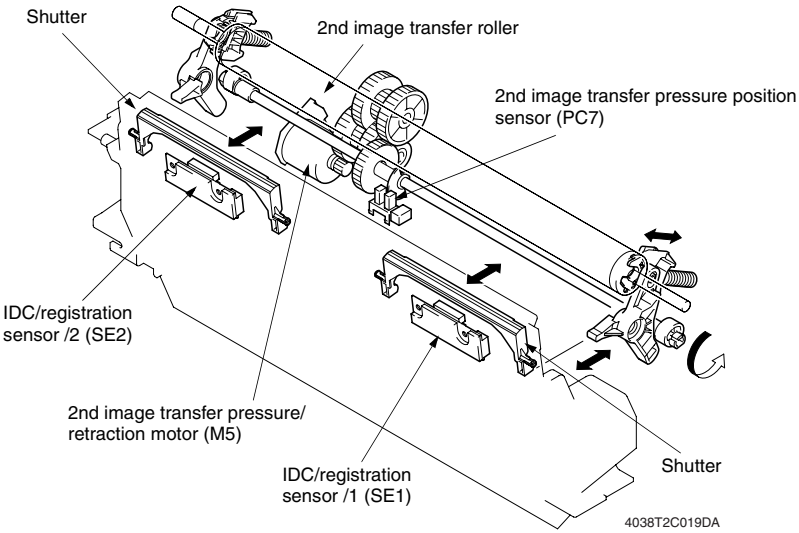
Temperature/humidity sensor (SE3)

2nd image transfer roller

Temperature/ humidity sensor (SE3)



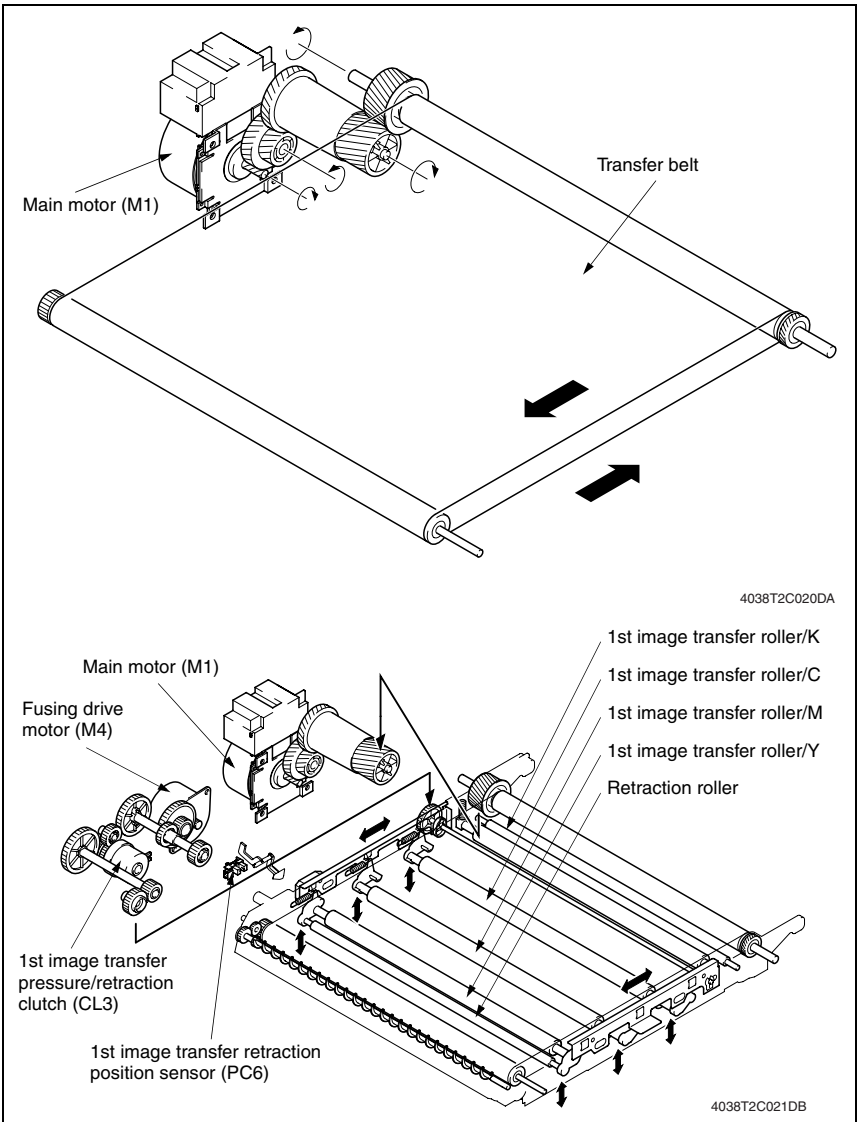
4038T2C152AA


Shutter
2nd image transfer roller
2nd image transfer pressure position sensor (PC7)
IDC/registration sensor /2 (SE2)
2nd image transfer pressure/ retraction motor (M5)
IDC/registration sensor /1 (SE1)
Shutter

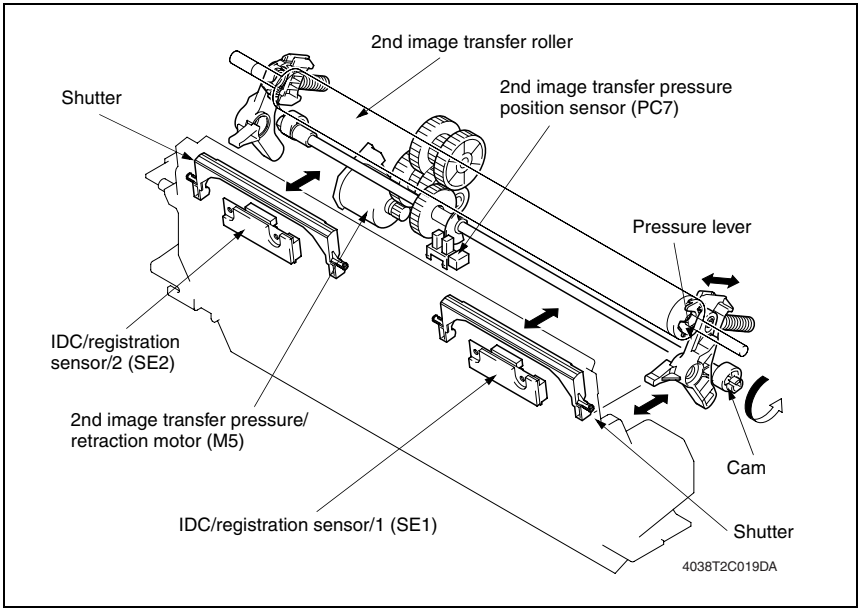
4038T2C019DA

14.2 Drive

14.2.1 1st image transfer section



14.2.2 2nd image transfer section



14.3 Operation

14.3.1 Transfer belt drive mechanism

- The transfer belt is driven by the main motor (M1).
- Revolving speed of the main motor (M1) can be switched by the motor clock.

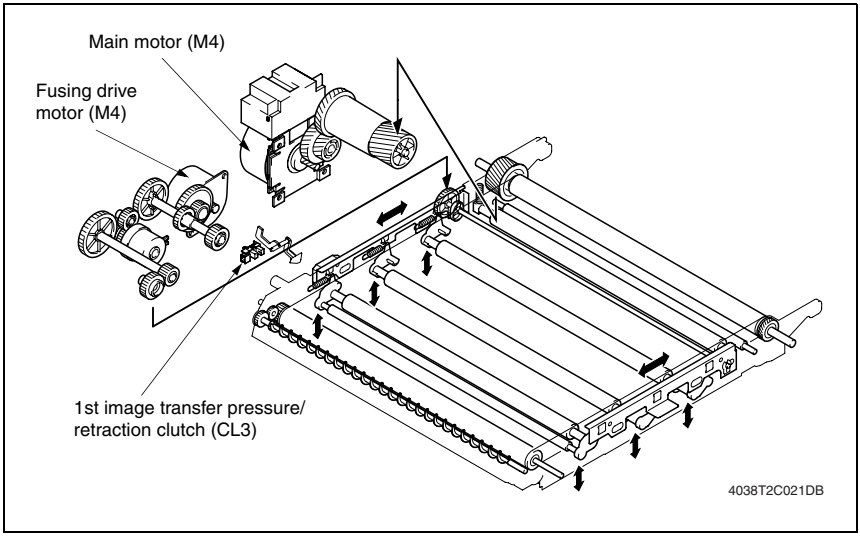
14.3.2 1st image transfer roller mechanism

- Pressure/retraction mechanism is equipped for pressing the 1st image transfer rollers (Y, M, C) to inside the transfer belt at the 1st image transfer.
- The 1st image transfer roller (K) does not have pressure/retraction mechanism. The 1st image transfer roller (K) always presses the transfer belt to the PC drum (K).
- Driving force is transferred from the fusing motor (M4) to the pressure/retraction mechanism through the 1st image transfer pressure/retraction clutch (CL3.)
- The 1st image transfer retraction position sensor (PC6) detects the 1st image transfer roller at its retracted position.

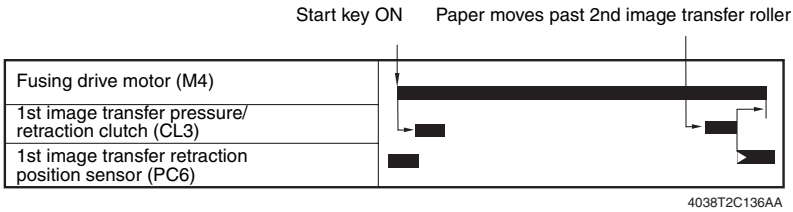
A. Pressure/retraction operation

- Pressure operation
  1. Rotation of the fusing drive motor (M4) is transferred to the 1st image transfer pressure/retraction clutch (CL3.)
  2. When the 1st image transfer pressure/retraction clutch (CL3) is turned ON, the rotation of the fusing drive motor (M4) is transferred to the drive gear.
  3. Rotation of the drive gear turns the pressure cam, which allows the sliding plate to move.
  4. The 1st image transfer roller (Y, M, and C) will move down to be pressed to the transfer belt when the sliding plate moves.
  5. The slide plate moves the actuator for the 1st image transfer retraction position sensor up.
  6. The actuator blocks the 1st image transfer retraction position sensor (PC6) to detect the slide plate's movement.
  7. Turn the 1st image transfer pressure/retraction clutch (CL3) OFF.
  8. The cam will stop rotating and the siding plate will stop.
  9. The 1st image transfer roller (Y, M, and C) will stay being pressed.

- Retraction operation
  1. The rotation of the fusing drive motor (M4) will be transferred to the 1st image transfer pressure/retraction clutch (CL3.)
  2. When the 1st image transfer pressure/retraction clutch (CL3) is turned ON, rotation of the fusing drive motor (M4) will be transferred to the drive gear.
  3. The cam will rotate to move the sliding plate as the drive gear rotates.
  4. The 1st image transfer roller (Y, M, and C) will move up to retract from the transfer Belt as the sliding plate moves.
  5. The slide plate moves the actuator for the 1st image transfer retraction position sensor down.
  6. The actuator unblocks the 1st image transfer retraction position sensor (PC6) to detect the slide's movement.
  7. Turn the 1st image transfer pressure/retraction clutch (CL3) OFF.
  8. The cam will stop rotating to stop the sliding plate.
  9. The 1st image transfer roller (Y, M, and C) will keep their retraction position.



- Operation timing


Start key ON
Paper moves past 2nd image transfer roller
Fusing drive motor (M4)
1st image transfer pressure/ retraction clutch (CL3)
1st image transfer retraction position sensor (PC6)
4038T2C136AA

B. Pressure position changing mechanism

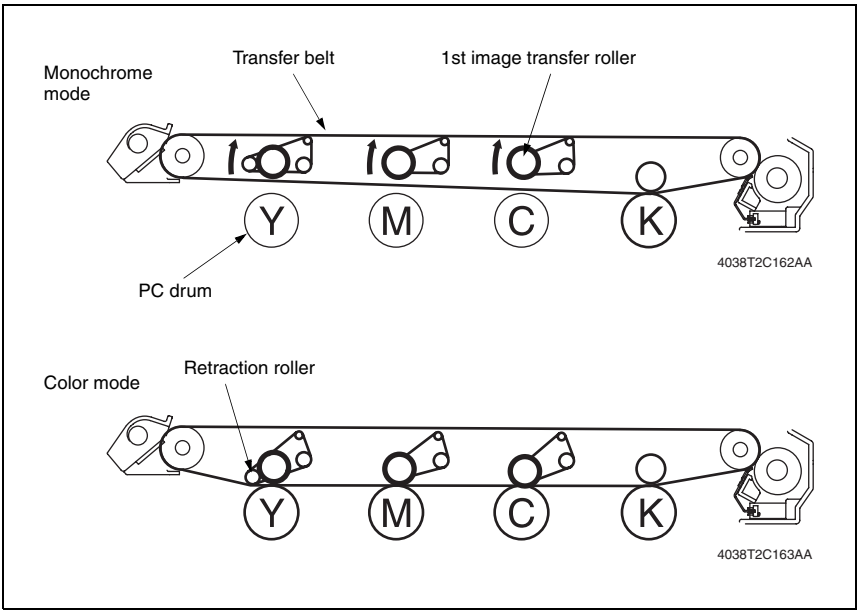
- To extend the service life of the PC drum/Y, M, C, the pressure position of the 1st image transfer roller is changed between the monochrome mode and the color mode. in the monochrome mode, the 1st image transfer roller/Y, M, C is left in the retracted position and the PC drum/Y, M, C is stopped.

Color mode:

- The pressure position of the image transfer roller is where the PC drum is in contact with the transfer belt for all four colors of toner.
- in order to transfer the original without missing any part, a retraction roller is mounted at the 1st image transfer roller/Y so the 1st image transfer roller/Y will properly contact to the PC drum/Y.

Monochrome mode:

- The pressure position of the image transfer roller/Y, M, C is where the PC drum/Y, M, C leaves the transfer belt. While that of the image transfer roller/K is where the PC drum/K is in contact with the transfer belt. This allows the PC drum/Y, M, C to remain stationary in this mode.

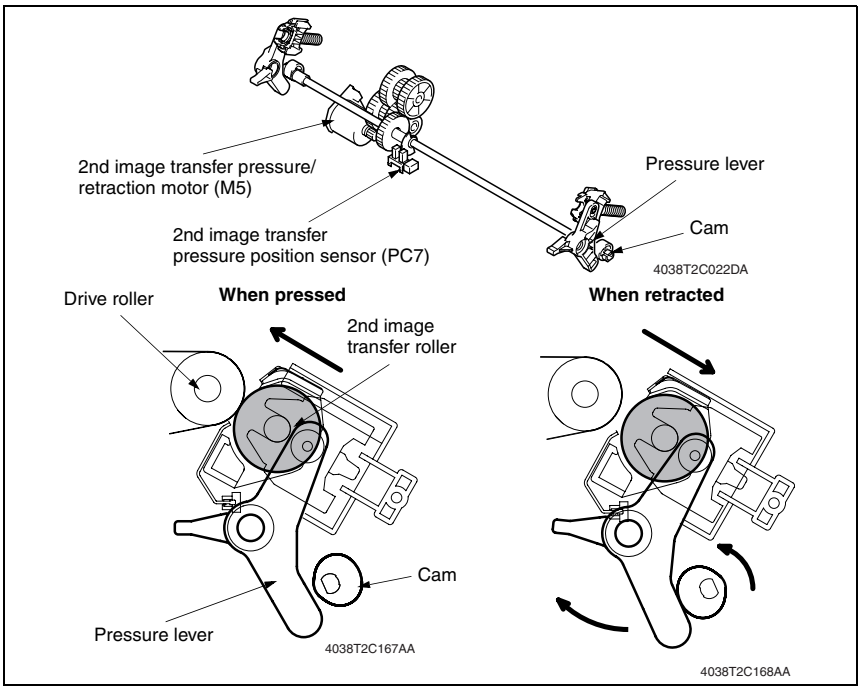


14.3.3 2nd image transfer roller pressure mechanism

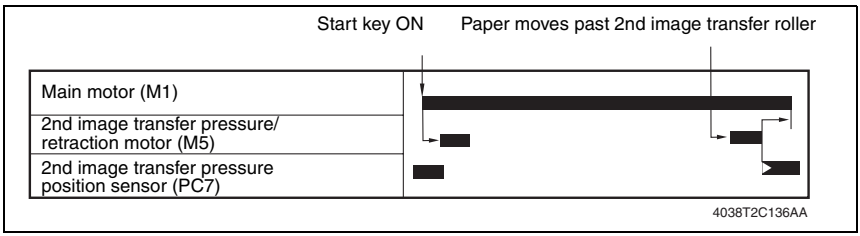
- The 2nd image transfer roller has the pressure/retraction mechanism which presses to and retracts from the transfer belt so the patterns made on the transfer belt except by printing (such as detection pattern during image stabilization) will not affect the 2nd image transfer roller.

A. Pressure/retraction operation

1. Drive from the 2nd image transfer pressure/retraction motor is transmitted through a gear train to the drive gear.
2. The drive gear rotates to rotate the cam half way. releasing the pressure lever will press the 2nd image transfer roller to the transfer belt.
3. At this time, the 2nd image transfer pressure position sensor detects whether the 2nd image transfer roller is located at the pressure position.
4. The cam will rotate half way when the motor turns ON again. Moving the pressure lever down will move the 2nd image transfer roller to the retraction position and will stop.



- Operation timing



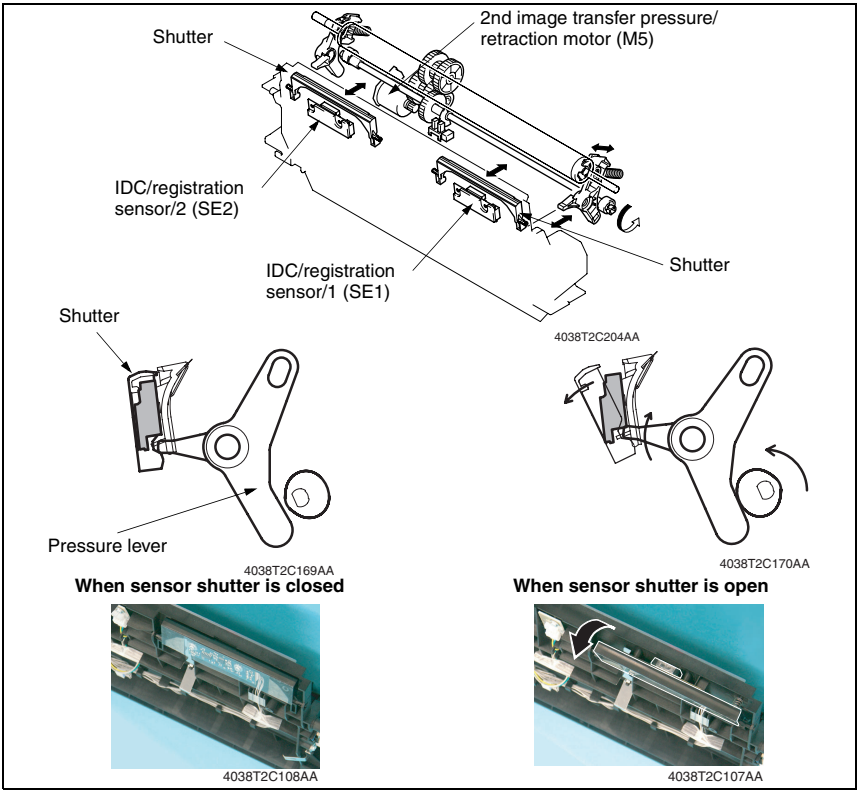
14.3.4 IDC sensor shutter mechanism

- The IDC sensor can be contaminated with toner since it is located under the transfer belt. There is a shutter mechanism provided for the sensor to prevent it from being contaminated.
- The shutter opens and closes in synchronism with the pressure and retraction motion of the 2nd image transfer roller.
- The cam will press the pressure lever to open the shutter on the IDC sensor during retraction.
- The cam will press the pressure lever to close the shutter on the IDC sensor while the roller is pressing.

2nd image transfer roller	Shutter
Retracted	Open
Pressed	Closed

A. Shutter open/close operation

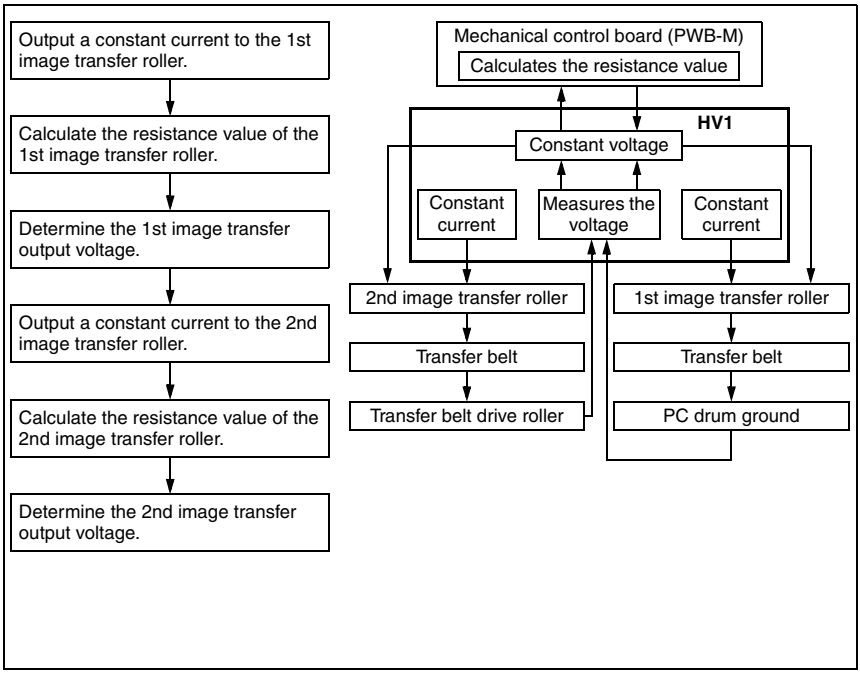
1. Drive from the 2nd image transfer pressure/retraction motor is transmitted through a gear train to the drive gear.
2. The drive gear will rotate to turn the cam half way. Pressing the pressure lever down will open the shutter.
3. Turning the motor ON again will turn the cam half way. Releasing the pressure lever will close the shutter.



14.3.5 ATVC (auto transfer voltage control)

- To optimize image transfer output, the machine is provided with ATVC control, or auto transfer voltage control. The control lets a constant current flow through each of the image transfer rollers. Then, from the voltage detected, the resistances of the 1st image transfer roller, 2nd image transfer roller, and transfer belt are measured. The optimum image transfer output voltages applied to the 1st and 2nd image transfer rollers during printing are thereby automatically adjusted.

A. Overview of ATVC operation


Output a constant current to the 1st image transfer roller.
Calculate the resistance value of the 1st image transfer roller.
Determine the 1st image transfer output voltage.
Output a constant current to the 2nd image transfer roller.
2
Calculate the resistance value of the 2nd image transfer roller.
Determine the 2nd image transfer output voltage.
Mechanical control board (PWB-M)
Calculates the resistance value
HV1
Constant voltage
Constant current
Measures the voltage
Constant current
2nd image transfer roller
1st image transfer roller
Transfer belt
Transfer belt
Transfer belt drive roller
PC drum ground

B. 1st image transfer ATVC operation

1. The 1st image transfer constant current for each color of toner output from the high voltage unit (HV1) is fed back to the high voltage unit (HV1) via the 1st image transfer roller, transfer belt, and PC drum ground.
2. Calculate the resistance value with the mechanical control board (PWB-M) according to the voltage detected by high voltage unit (HV1).
3. The measured resistance is used as the basis for determining the optimum 1st image transfer voltage for each color of toner.

C. 2nd image transfer ATVC operation

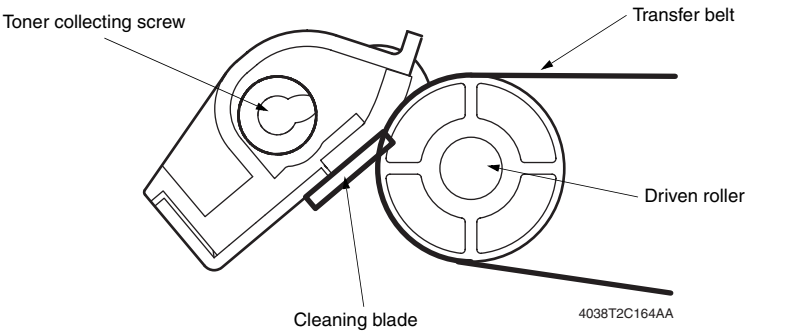
1. Constant current of the 2nd image transfer which is output from the high pressure unit (HV1) will be fed back to the mechanical control board (PWB-M) through 2nd image transfer roller, transfer belt, and the transfer belt drive roller.
2. Calculate the resistance value with the mechanical control board (PWB-M) according to the voltage detected by high voltage unit (HV1).
3. The measured resistance, together with the type of paper, temperature and humidity, and the color or monochrome mode 1st side/2nd side, is used as the basis for determining the optimum 2nd image transfer voltage.

D. 1st and 2nd image transfer ATVC operation timing

- The 1st and 2nd image transfer ATVC operations are carried out immediately before the execution of image stabilization control.
- The control operation is performed when the threshold value of the change in interior temperature is exceeded.

14.3.6 Transfer belt cleaning

- The cleaning blade is mounted on the transfer belt in order to remove the remaining toner at the transfer belt.
- The cleaning blade is always pressed to the transfer belt by the fixed blade system.



14.3.7 Reversing control of the transfer belt

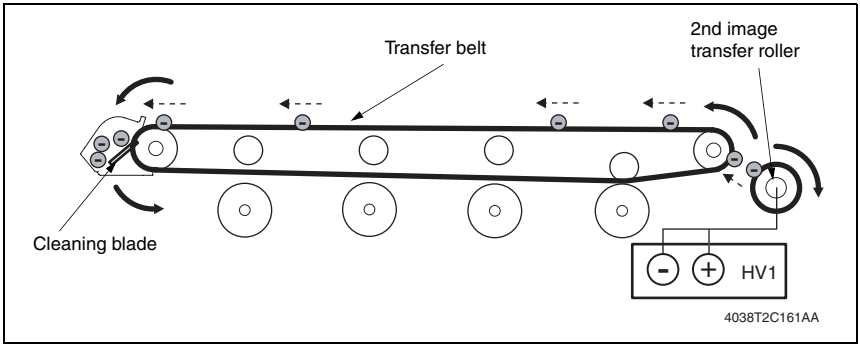
- Paper dust or toner between the transfer belt and the edge of the cleaning blade will be removed by slightly rotating the transfer belt backward and then rotating it forward again.

A. Operation timing

- The cleaning will be executed at the end of each print job sequence.
- cleaning will be performed when the power is turned ON, the door is opened or closed, or the sleep mode is released.

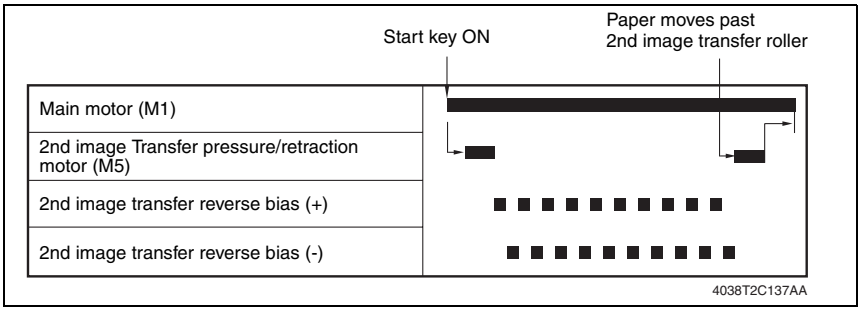
14.3.8 2nd image transfer roller cleaning

- In order to remove the remaining toner on the 2nd image transfer roller, -/+ (DC) charge is applied alternately to transfer the remaining toner on the 2nd image transfer roller to the transfer belt.
- The cleaning blade then scrapes off the toner on the surface of the transfer belt.



A. Operation timing

- The 2nd image transfer cleaning will be performed in sync with image stabilization.
- The 2nd image transfer cleaning will be performed when mode 2 (regular stabilization) for the image stabilization control is being operated.


Start key ON
Paper moves past 2nd image transfer roller
Main motor (M1)
2nd image Transfer pressure/retraction motor (M5)
2nd image transfer reverse bias (+)
2nd image transfer reverse bias (-)
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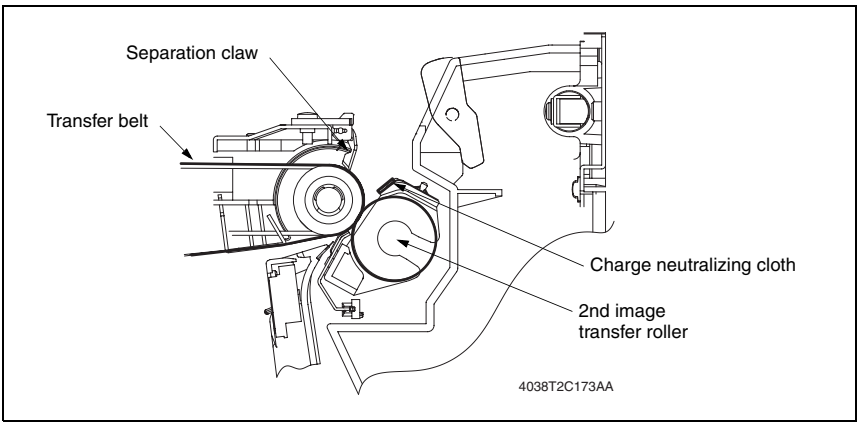
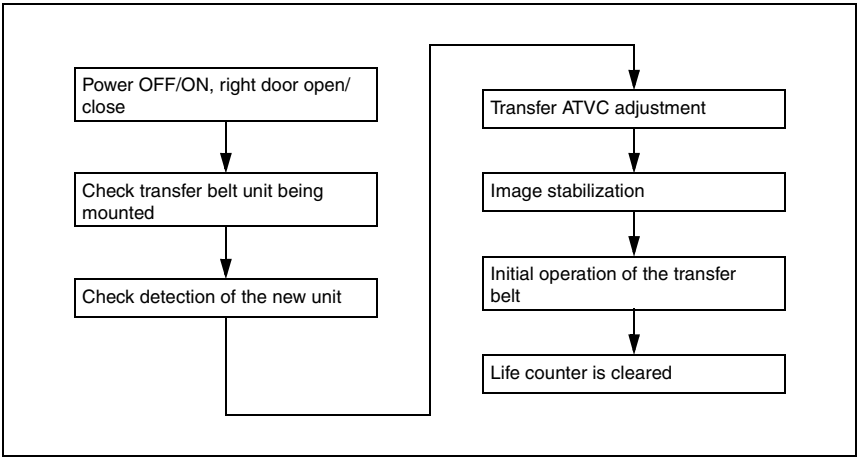
14.3.9 Charge neutralization and separation of paper

- In order to remove the residual potential on the paper with the 2nd image transferred, the neutralization material is applied to the guide plate without contact after the 2nd image transfer roller.
- In order to separate the paper from the transfer belt without fail after the 2nd image transfer, a transfer belt separation claw is mounted (one point.)



14.3.10 Detection of new transfer belt unit

- When a new transfer belt unit is installed in the machine, the life counter is automatically cleared through new unit detection.
- △2 The new unit detection is made when the power switch is turned OFF and ON or the right door is opened and closed.
- New unit detection timing/operation


Power OFF/ON, right door open/ close
Check transfer belt unit being mounted
Check detection of the new unit
Transfer ATVC adjustment
Image stabilization
Initial operation of the transfer belt
Life counter is cleared

14.3.11 Pressure/retraction control during ACS mode

- The pressure/retraction of the 1st image transfer roller is controlled by the number of multiple copies for the monochrome original during multi-copy cycle, so it promotes the high productivity and extends the consumables' life.

* ACS: auto color selection

A. Operation

- ACS control starts counting the number of multi-copies of the monochrome original when switched from the color original to the monochrome original.
- When the number of multi-copies is as specified or under
  : The monochrome printing will start with color mode. (with the 1st image transfer roller/ Y/M/C being pressed)
  IU (Y/M/C) does not develop or transfer the image, but it rotates when the pressed transfer belt rotates.
  The transfer belt being pressed saves time since the 1st image transfer roller does not need to be retracted.
- When the number of multi-copies is as specified or over.
  : The monochrome printing will start when the color mode is complete and the 1st image transfer roller /Y/M/C is retracted to be switched to the monochrome mode.
  The transfer belt being retracted prevents IU to be wasted by useless rotation.

- Number of multiple copies of monochrome original when paper feed speed is 111 mm/s.

Paper length	Monochrome printing in color mode	Monochrome printing after switched to monochrome mode
216 mm or under	4 sheets or less	5 sheets or more
over 216 mm up to 297 mm	2 sheets or less	3 sheets or more
over 297 mm up to 381 mm	2 sheets or less	3 sheets or more
over 382 mm up to 432 mm	1 sheets or less	2 sheets or more
over 433 mm	Switched to monochrome mode	1 sheets or more

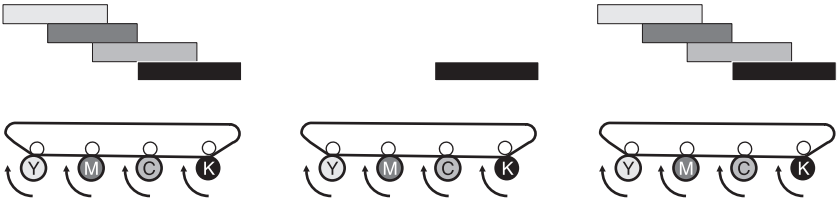
- Number of multiple copies of monochrome original when paper feed speed is 55.5 mm/s.

Paper length	Monochrome printing in color mode	Monochrome printing after switched to monochrome mode
216 mm or under	4 sheets or less	5 sheets or more
over 216 mm up to 297 mm	2 sheets or less	3 sheets or more
over 297 mm up to 381 mm	1 sheets or less	2 sheets or more
over 382 mm up to 432 mm	1 sheets or less	2 sheets or more
over 433 mm	Switched to monochrome mode	1 sheets or more

- ACS control operates only after the number of multi-copies for monochrome original is counted.
  "The pressure/retraction control for ACS mode" will not be properly executed with only one sheet of print job, since on the first copy, the control can be performed only for where the original is read and counted.
  The ACS control performs effectively for the print jobs as listed below.
  For the 2nd set of prints onward in electronic sorting
  Printing using job programs

When printing in monochrome with color mode
(effecting monochrome printing with the four PC drums rotating)

First sheet of color mode → First sheet of monochrome mode → First sheet of color mode



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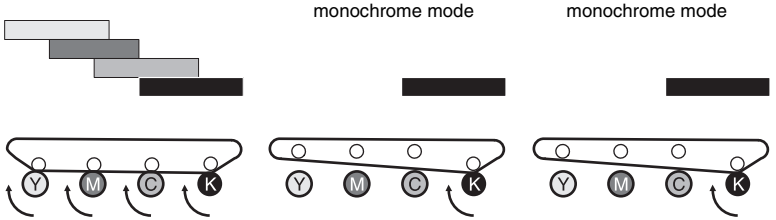
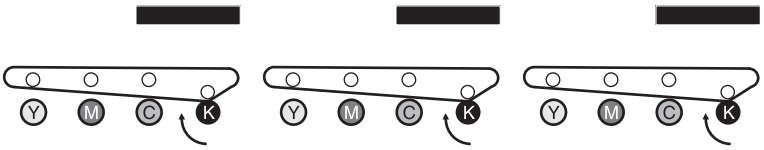
Switching to monochrome mode

First sheet of color mode → First sheet of monochrome mode → Second sheet of monochrome mode



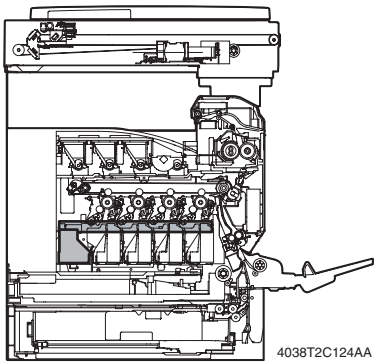
Third sheet of monochrome mode → Fourth sheet of monochrome mode → Fifth sheet of monochrome mode



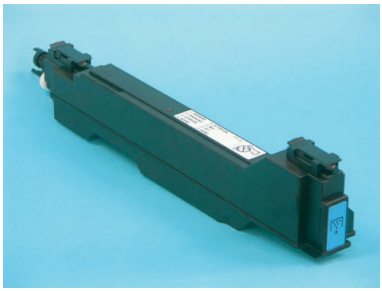
4038T2C166AA

15. Toner collecting section

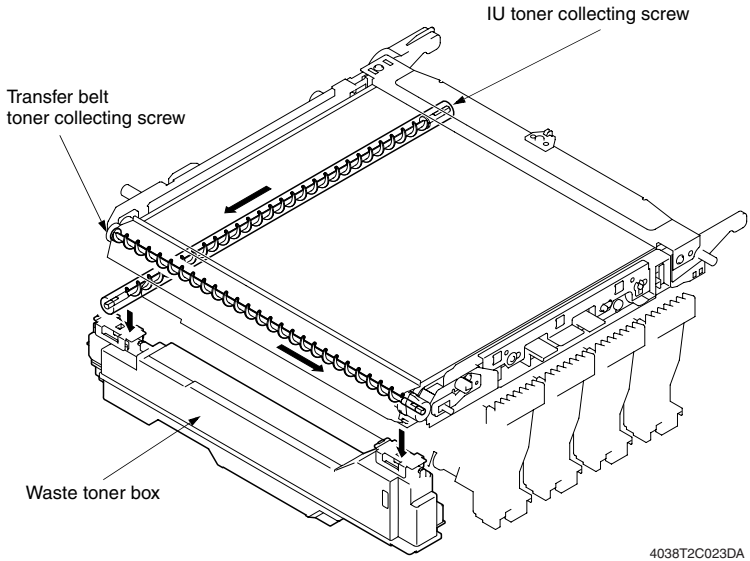
15.1 Composition



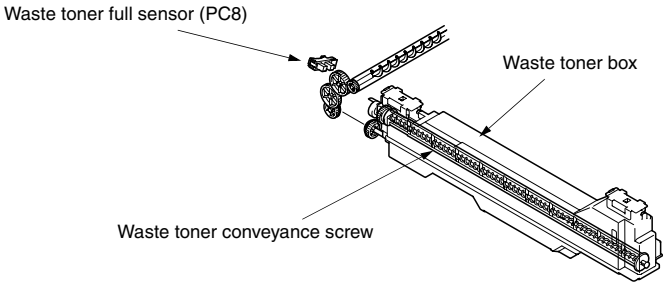
4038T2C124AA



4038T2C110AA

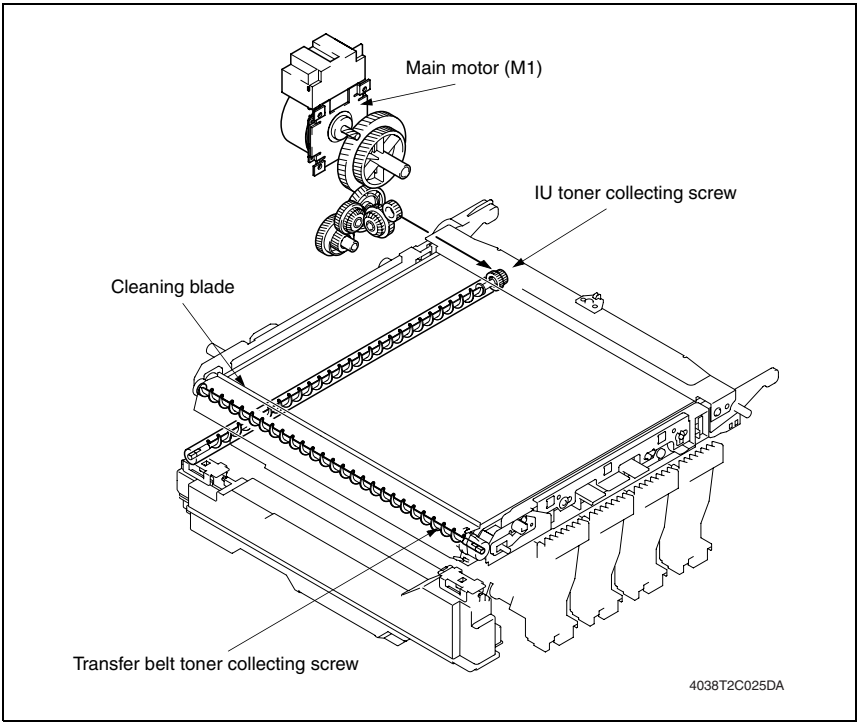


4038T2C023DA



4038T2C024DA

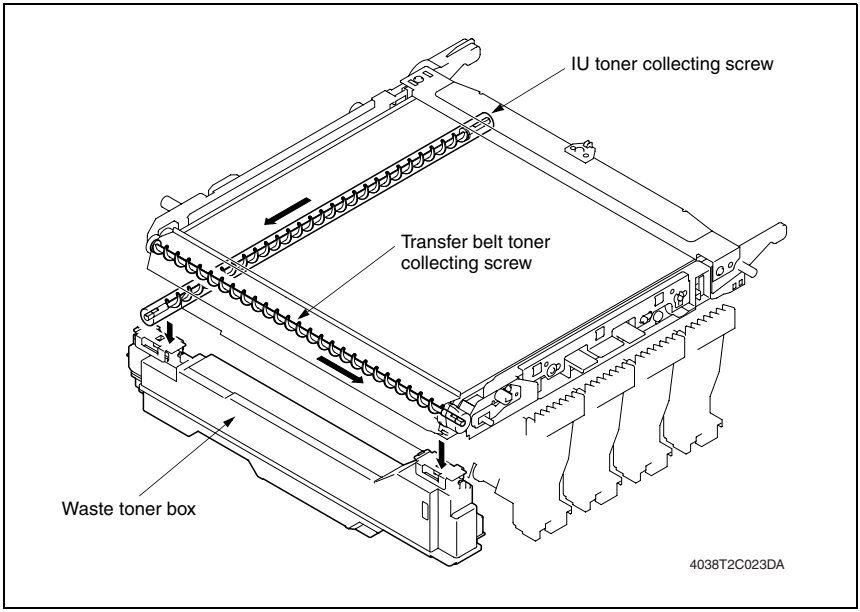
15.2 Drive


Main motor (M1)
IU toner collecting screw
Cleaning blade
Transfer belt toner collecting screw
4038T2C025DA

15.3 Operation

15.3.1 Toner collecting mechanism

- Toner collected by the cleaning blade of the transfer belt and waste toner in each of the imaging units are conveyed by the corresponding toner collecting screws to the waste toner box.



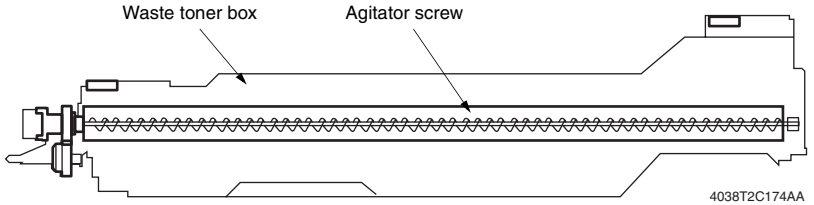
15.3.2 Waste toner box set detection

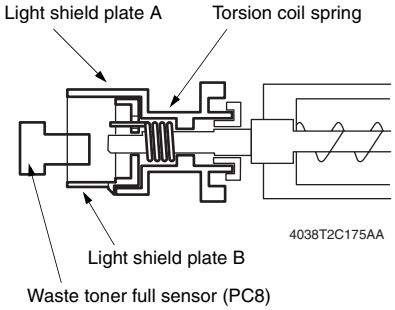
- The waste toner full detection signal on the water toner full sensor (PC8) detects set/unset of the waste toner box.
- Set/unset of the waste toner box is detected when the front door is closed with the main power being ON. The printing will stop when the waste toner box is not set.

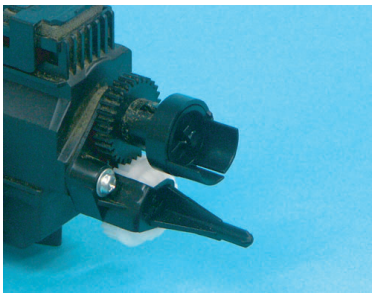
15.3.3 Waste toner near-full/full detection control

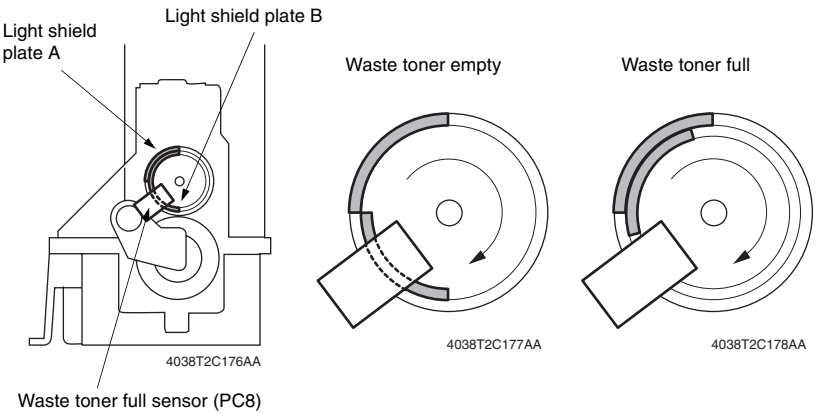
A. Waste toner detection mechanism

- To prevent false detection, an agitation screw is mounted in the waste toner box so that the waste toner is accumulated in the bottle evenly.
- The waste toner full sensor (PC8) detects the area where the visor a mounted on the shaft of the toner conveying screw overlaps with the visor B.
- As the amount of the waste toner increases, the load for the screw to rotate will increase. The period of time the light shield Plate blocks the waste toner full sensor (PC8) will then become shorter.



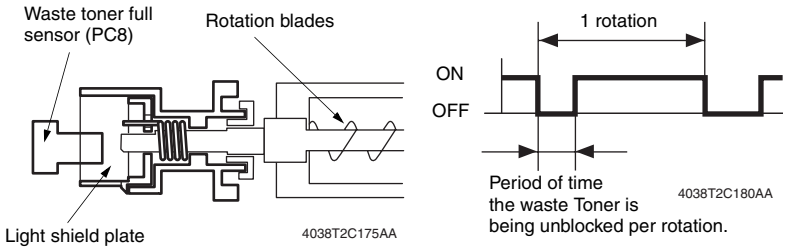




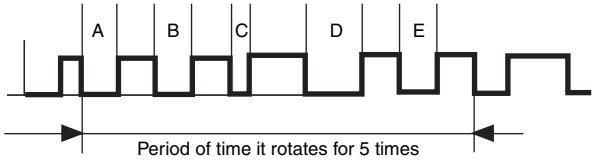


B. Waste toner level check control

- The amount of toner is determined by the period of time the waste toner full sensor (PC8) is being blocked while the moving vane of the transport screw rotates five times.
- The period of time the sensor is being blocked is divided into four levels. Level 3 is judged as “waste toner near-full”, and level 4 as “waste toner full.”
- Once the toner-full is detected, it has to be replaced with the new waste toner box in order to reset.

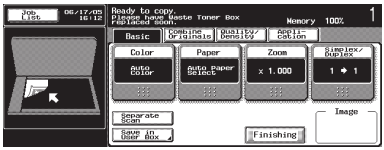


A+B+C+D+E = the period of time the waste toner full sensor is being unblocked.



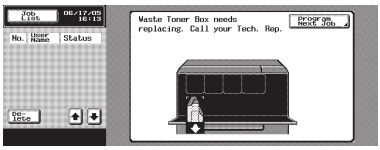
Level	State	Unblocked time /rotation time	Operation
Level 1	No toner	40% to less than 55%	-
Level 2	Toner low	34% to less than 40%	-
Level 3	Waste toner near-full	30% to less than 34%	• Displays “waste toner near-full” • Ready for printing
Level 4	Waste toner full	20% to less than 30%	• Displays “waste toner full” • Printing not available • When detected during the job, printing will stop when all paper exit.

Display for the waste toner near-full detection



4038T2E205AA

Display for the waste toner full detection



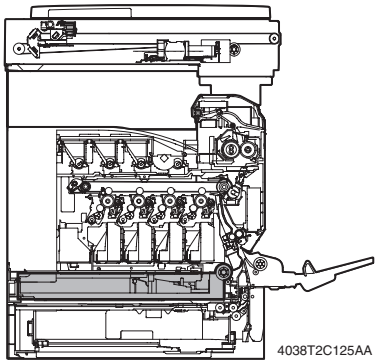
4038T2E206AA

- A different toner full warning screen is displayed if “user” is selected for “unit change” available from the tech. rep. mode.

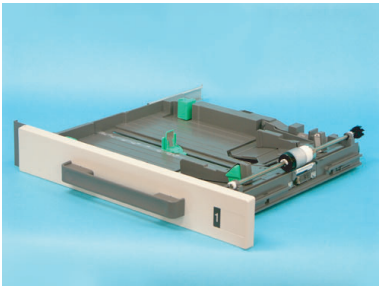
16. Paper feed section

16.1 Composition

16.1.1 Tray1



4038T2C125AA

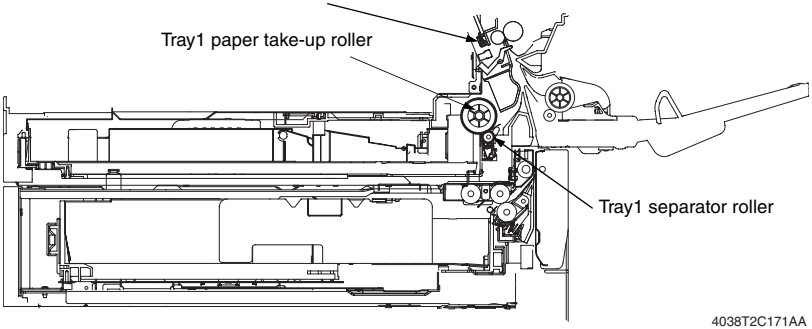


4038T2C111AA

Registration roller sensor (PC1)

Tray1 paper take-up roller

Tray1 separator roller



4038T2C171AA

Tray 1 device detection sensor (PC12)

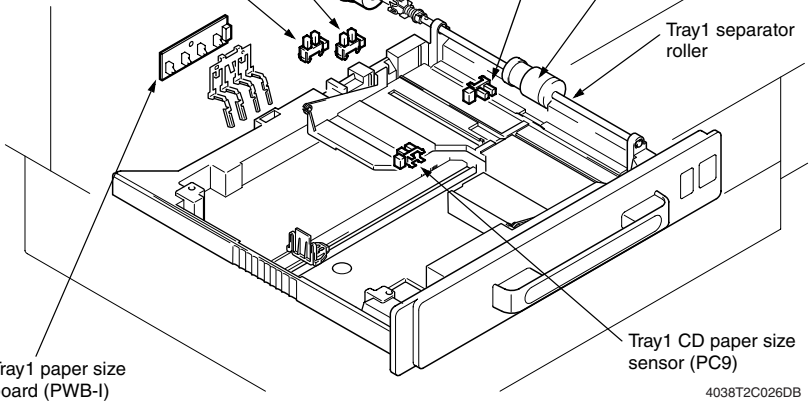
Tray1 paper feed clutch (CL2)

Tray1 paper empty sensor (PC10)

Tray1 paper near-empty sensor (PC11)

Tray1 paper take-up roller

Tray1 separator roller

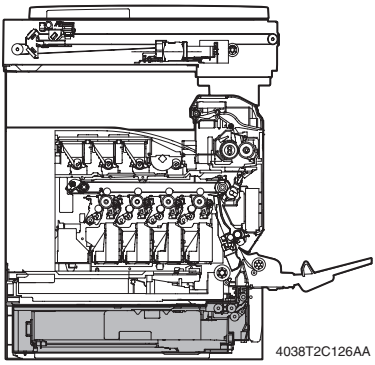


Tray1 CD paper size sensor (PC9)

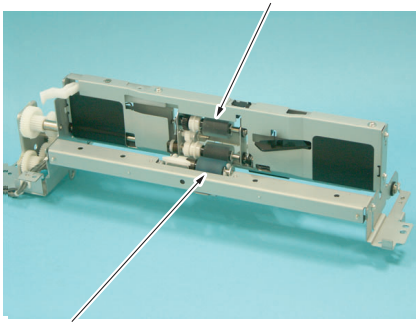
Tray1 paper size board (PWB-I)

4038T2C026DB

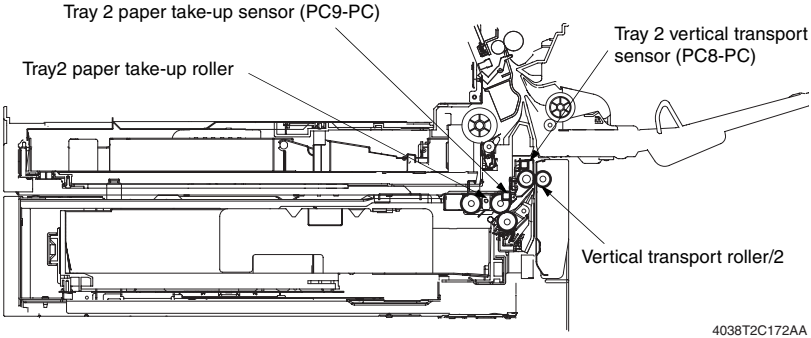
16.1.2 Tray2



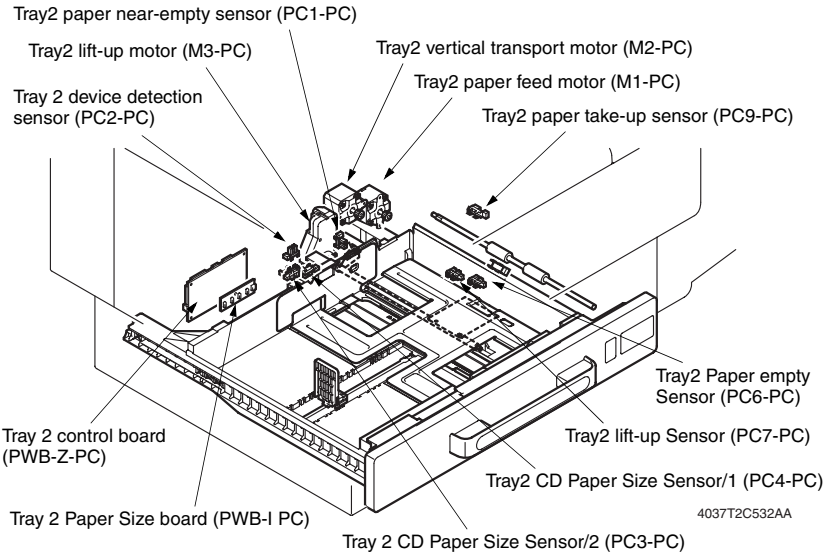
4038T2C126AA



4038T2C127AA


Tray 2 paper take-up sensor (PC9-PC)
Tray 2 vertical transport sensor (PC8-PC)
Tray2 paper take-up roller
Vertical transport roller/2

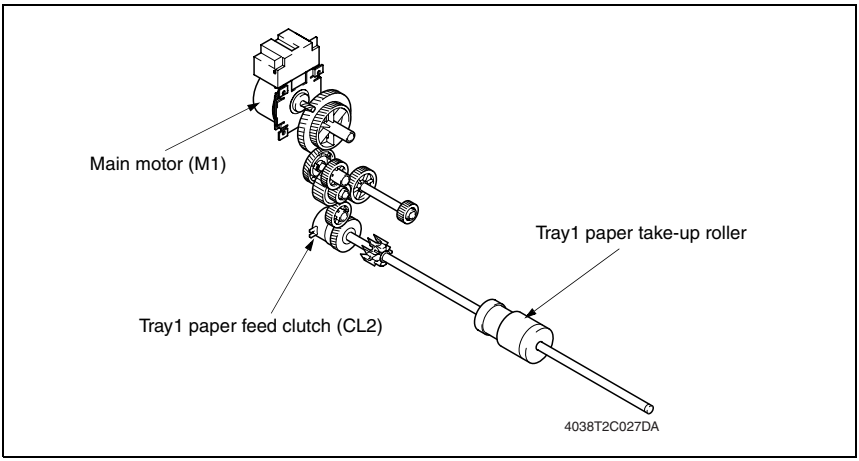
4038T2C172AA


Tray2 paper near-empty sensor (PC1-PC)
Tray2 lift-up motor (M3-PC)
Tray2 vertical transport motor (M2-PC)
Tray2 paper feed motor (M1-PC)
Tray 2 device detection sensor (PC2-PC)
Tray2 paper take-up sensor (PC9-PC)
Tray2 Paper empty Sensor (PC6-PC)
Tray 2 control board (PWB-Z-PC)
Tray2 lift-up Sensor (PC7-PC)
Tray2 CD Paper Size Sensor/1 (PC4-PC)
Tray 2 Paper Size board (PWB-I PC)
Tray 2 CD Paper Size Sensor/2 (PC3-PC)

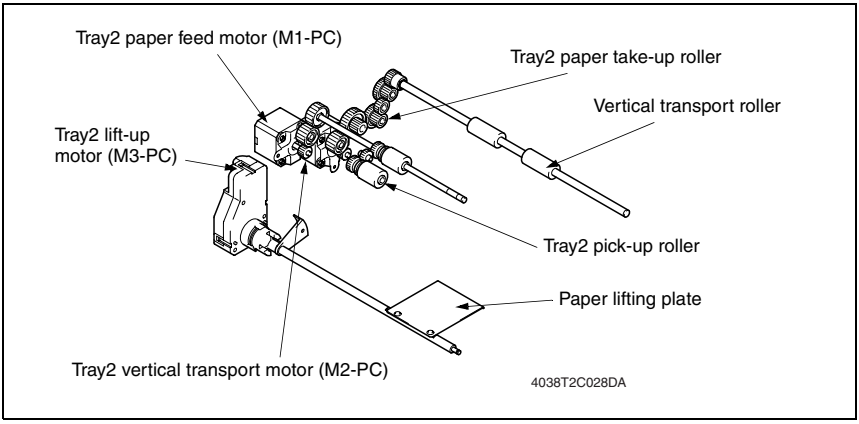
4037T2C532AA

16.2 Drive

16.2.1 Tray1

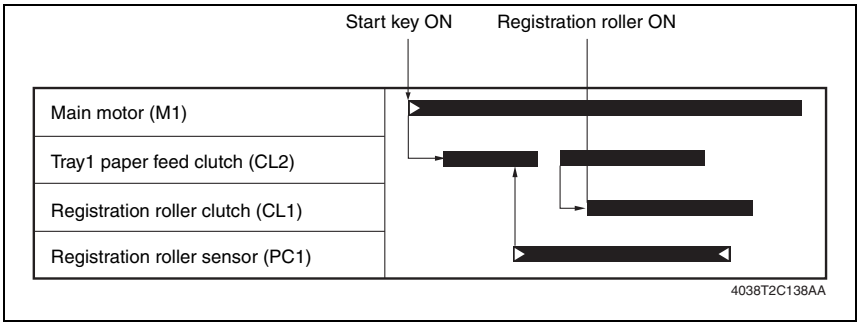


16.2.2 Tray2



16.3 Operation

16.3.1 Paper take-up control (tray1)



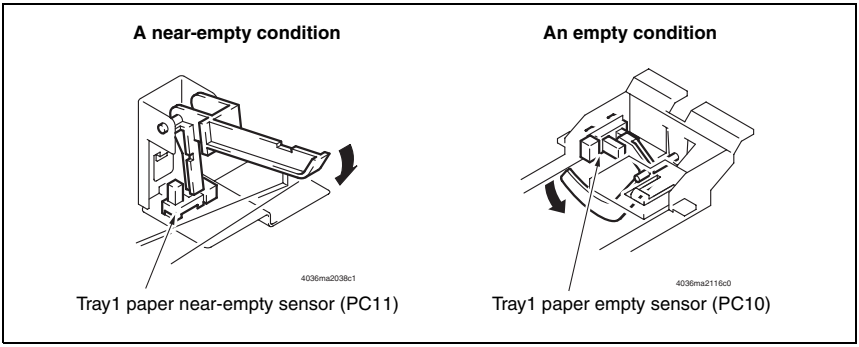
16.3.2 Paper supply level detection control (tray2)

- There is a window in the front cover of the cassette for indicating the paper supply level (tray2 only).
- When the paper lifting plate goes up, a red lever appears in the window. The lower the level of the paper stack, the more the red portion is visible.

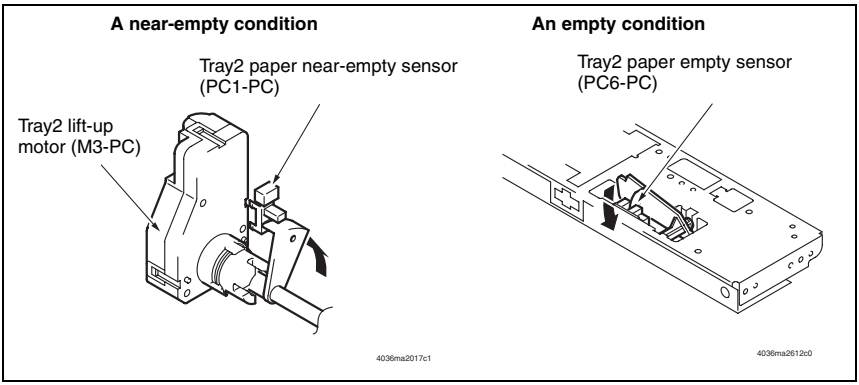
16.3.3 Paper near-empty/paper empty detection

- When the paper near-empty sensor is blocked, a corresponding warning display is given on the control panel.
- The paper supply level when a paper near-empty condition is detected is about 50 ± 30 sheets.
- The paper empty sensor detects a paper empty condition.

Tray1



Tray2



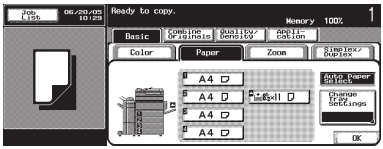
16.3.4 Paper type setting

- The paper type is set from the control panel. Control is provided on the main body side differently as detailed below depending on the paper type setting made.

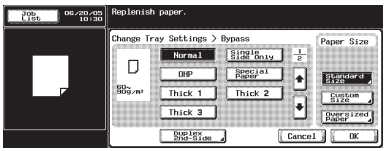
Paper type		System speed (mm/s)	Heating roller set temperature (°C)	1st Image transfer output	2nd Image transfer output	Grid voltage (Vg)	Developing bias voltage (Vdc)	Gamma table
		Monochrome mode						
		Color mode						
Plain paper/single side only/special paper/colored paper/letterhead		111	●	×	❍	❍	×	❍
		111						
OHP transparencies		55.5						
		55.5						
Thick paper 1/2/3		55.5						
		55.5						
Envelopes		55.5						
		55.5						
2nd side of 2-sided printing	Plain paper	55.5						
	Thick paper	55.5						

●: Varies according to the number of copies/paper size
❍: Varies according to the paper type/printing side
× : Not vary

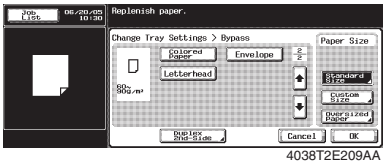
- Select thick paper 1 to use labels.



4038T2E207AA



4038T2E208AA



4038T2E209AA

16.3.5 Paper size detection control

- Paper width/length are detected to determine the paper size from their combination.

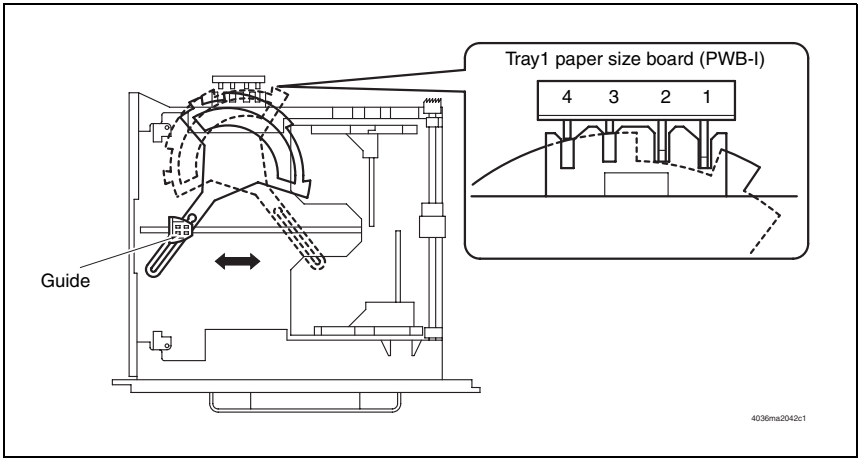
A. Tray1
Metric area

Paper size	Tray1 paper size board (PWB-I)				Tray1 CD paper size sensor (PC9)
	SW1	SW2	SW3	SW4	
A6S	ON	OFF	ON	OFF	H
A5	ON	OFF	ON	OFF	L
B6S	OFF	ON	OFF	ON	H
B5	OFF	ON	OFF	ON	L
A5S	OFF	OFF	ON	OFF	H
A4	OFF	OFF	ON	OFF	L
B5S	ON	ON	ON/OFF	OFF	H
B5S*	OFF	ON	OFF	OFF	H
	OFF	ON	ON	OFF	H
	ON	ON	ON	OFF	H
A4S	OFF	OFF	OFF	ON	L
A4S*	OFF	OFF	OFF	OFF	L
A3	ON	ON	ON	ON	L
A3 Wide	OFF	ON	ON	ON	L
FLS	ON	OFF	OFF	OFF	L

Inch area

Paper size	Tray1 paper size board (PWB-I)				Tray1 CD paper size sensor (PC9)
	SW1	SW2	SW3	SW4	
5.5 × 8.5S	OFF	OFF	ON	OFF	H
8.5 × 11	OFF	OFF	ON	OFF	L
8.5 × 11S	OFF	OFF	ON	ON	L
Executive	OFF	ON	OFF	ON	L
Executive S	OFF	ON	ON	OFF	H
5.5 × 8.5	ON	OFF	ON	OFF	L
8.5 × 14	ON	ON	ON	OFF	L
11 × 17	ON	ON	ON	ON	L

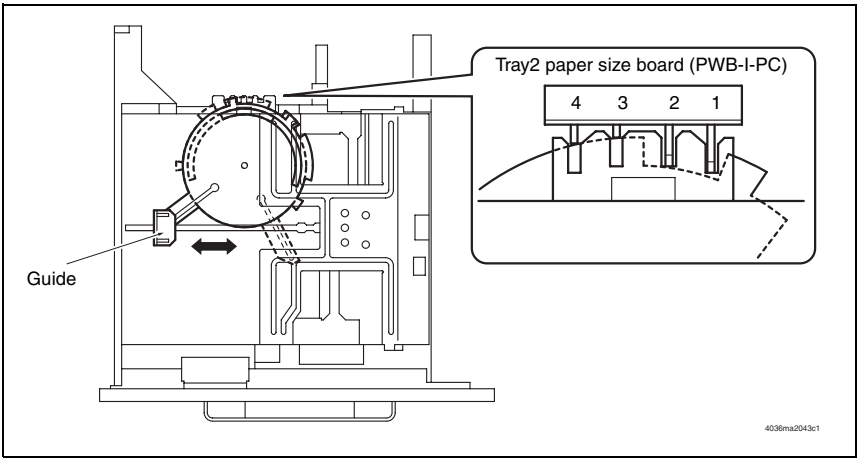
*: This combination will also be used due to the sensor's ability.
H: Blocking
L: Unblocking


Tray1 paper size board (PWB-I)
4 3 2 1
Guide
4036ma2042c1

B. Tray2

Paper size	Tray2 paper size board (PWB-I-PC)				Tray2 CD paper size sensor /1 (PC4-PC)	Tray2 CD paper size sensor /2 (PC3-PC)
	SW1	SW2	SW3	SW4		
A3	ON	ON/OFF	ON	ON	H	L
B4	ON	ON	ON	OFF	H	L
A4S	OFF	ON/OFF	ON	ON	L	H
A4	ON/OFF	OFF	OFF	OFF	H	L
B5S	OFF	OFF	ON	OFF	L	L
B5	ON	ON	OFF	OFF	H	L
A5S *1	ON/OFF	OFF	OFF	OFF	L	L
11 × 17	ON	OFF	ON	ON	H	H
Legal	ON	ON	ON	OFF	L	H
Letter S	ON	OFF	OFF	ON	L	H
Letter	OFF	OFF	OFF	OFF	H	H
Invoice S *2	OFF	OFF	OFF	OFF	L	L
Folio S (8-1/4 × 13)	ON	ON	ON	ON	L	H
FLS	ON	ON	ON	ON	L	H
K8 S (270 mm × 390 mm)	ON	ON	OFF	ON	H	H
K16 (270 mm × 195 mm)	ON	OFF	OFF	OFF	H	H

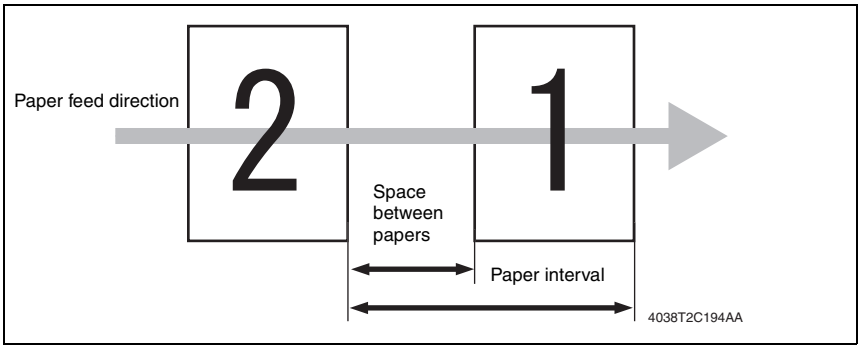
*1: Metric area only
*2: Inch area only
H: Blocking
L: Unblocking



16.3.6 Paper Interval control (PPM control)

- It sets the proper interval between papers (pitch) according to the paper size and mode for multiple printing.

A. Basic paper interval control



- Basic paper interval group

	Paper size
A1	INVOICE, POSTCARDS S, A5, B5, QUART, G.LETTER, A5S, A4
A2	INVOICE S, LETTER
B	B5S, G.LETTER S, FLS(192 mm × 268 mm) S, LETTER S, A4S
C	FLS(203.2 mm × 330.2 mm) S, G.LEGAL S, FOLIO S, LEGAL S, FOLIO Eu S, 11×14S, B4S, Comp. Form S
D	A3S, W. LETTER S
E	A3 WIDE S
F	Long paper

- Basic paper interval list

Mode	System speed	Group	Paper interval	Mode	System speed	Group	Paper interval
Plain paper/ monochrome, plain paper/ color	111 mm/s	A1	263.12 mm	Thick paper, OHP transparencies	55.5 mm/s	A1	263.12 mm
		A2	268.64 mm			A2	268.64 mm
		B	358.80 mm			B	359.72 mm
		C	441.60 mm			C	442.52 mm
		D	493.12 mm			D	493.12 mm
		E	517.04 mm			E	517.96 mm
		F	Paper length +81.12 mm			F	Paper length +61.80 mm

- When the paper interval calculated by “PPM control” is larger than the one calculated by “best paper interval”, the one calculated by “PPM control” will be used.

B. PPM control

- It prevents the temperature at the edge of the fusing roller from increasing due to the multiple printing with small size paper.
- It sets the appropriate paper interval (pitch) according to the paper size and mode.
- Proper paper interval will be set so the fusing parts will not be damaged and still assures sufficient fusing ability.

- Paper interval group for PPM control

Paper length		Paper width	
	Paper size		Paper size
A1	INVOICE, POSTCARDS S, A5, B5, QUART, G.LETTER, A5S, A4	V	POSTCARDS S
A2	INVOICE S, LETTER	W	INVOICE S
B	B5S, G.LETTER S, FLS(192 mm × 268 mm) S, LETTER S, A4S	X	A5S, B5S, FLS(192 mm × 268 mm) S, G.LETTER S, FLS(203.2 mm × 330.2 mm) S
C	FLS(203.2 mm × 330.2 mm) S, G.LEGAL S, FOLIO S, LEGAL S, FOLIO Eu S, 11×14S, B4S, Comp. Form S	Y	FOLIO S, FOLIO Eu S, A5, A4S, INVOICE, LETTER S, G.LEGAL S, LEGAL S, QUART, B5, B4S
D	A3S, W. LETTER S	Z	G.LETTER, LETTER, 11×14S, Comp. Form S, W. LETTER S, A4, A3S, A3 WIDE S
E	A3 WIDE S	-	-
F	Long paper	-	-

- PPM control paper interval list

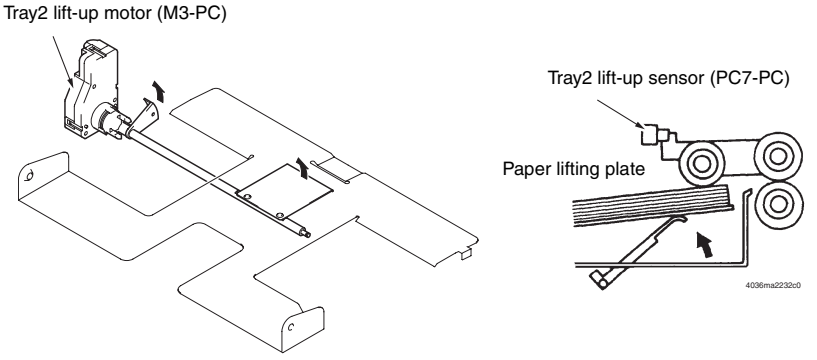
Mode	System speed	Group	V	W	X	Y	Z
Plain paper/ monochrome, plain paper/ color	111 mm/s	A1	331.20 mm			263.120 mm	
		A2	340.40 mm			268.64 mm	
		B	467.36 mm			388.24 mm	371.68 mm
		C	599.84 mm			441.6 mm	476.56 mm
		D	680.80 mm			502.32 mm	493.12 mm
		E	719.44 mm			531.76 mm	520.72 mm
		F	3312.00 mm				2270.56 mm
Thick paper (thick paper 1, thick paper 2)	55.5 mm/s	A1	316.48 mm	332.12 mm	332.12 mm	263.12 mm	263.12 mm
		A2	342.24 mm			268.64 mm	
		B	470.12 mm			391 mm	373.52 mm
		C	603.52 mm			442.52 mm	479.32 mm
		D	684.48 mm			505.08 mm	493.12 mm
		E	724.04 mm			534.52 mm	524.40 mm
		F	3329.48 mm				2282.52 mm
Thick paper (thick paper 3)	55.5 mm/s	A1	474.80 mm	602.60 mm		392.84 mm	315.56 mm
		A2	512.44 mm	602.60 mm		402.04 mm	322.00mm
		B	703.80 mm			636.64 mm	447.12 mm
		C	903.44 mm			736.00 mm	575.00 mm
		D	1024.88 mm			756.24 mm	591.56 mm
		E	1083.76		800.40 mm		624.68 mm
		F	4984.56 mm				2760.00 mm
OHP transparencies	55.5 mm/s	A1	554.76 mm				
		A2					

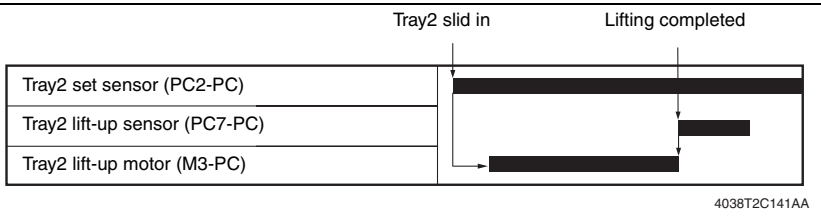
- When the paper interval calculated by “best paper interval” is larger than the one calculated by “PPM control”, the one calculated by “best paper interval” will be used.

16.3.7 Tray2 paper lifting motion control

A. When tray2 is slid in

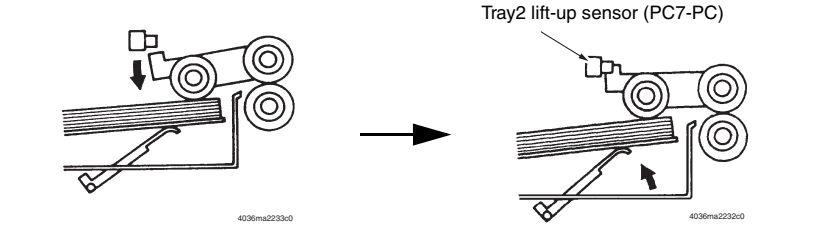
- When the tray 2 lift-up upper sensor (PC-7 PC) is unblocked (OFF) with the tray 2 being closed, tray 2 lift-up motor (M3-PC) will rotate to start lifting up the paper lifting plate.
- When the tray 2 lift-up upper sensor (PC-7 PC) is blocked (ON) after the paper lifting plate starts moving up, the trays 2 lift-up motor (M3-PC) will stop to stop lifting the paper lifting plate.





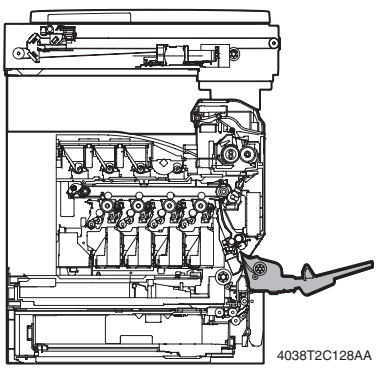
B. During a print cycle

- When the amount of paper decreases as the unit keeps printing, the feed roller will gradually come down to unblock the trays 2 lift-up upper sensor (PC-7PC). The tray 2 lift-up motor (M3-PC) will rotate again to lift up the Paper lifting Plate.
- When the tray 2 lift-up upper sensor (PC-7 PC) is blocked (ON), the trays 2 lift-up motor (M3-PC) will stop to stop lifting the paper lifting plate.
- The sequence of these operations is repeated to keep constant the pressure between the paper take-up roller and paper stack (paper take-up pressure) regardless of the amount of paper still available for use.

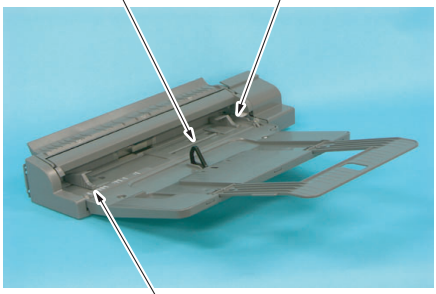


17. Bypass section (bizhub C250)

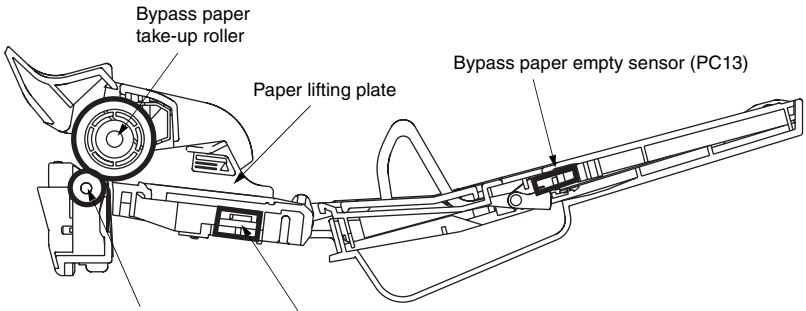
· **Composition**.



4038T2C128AA



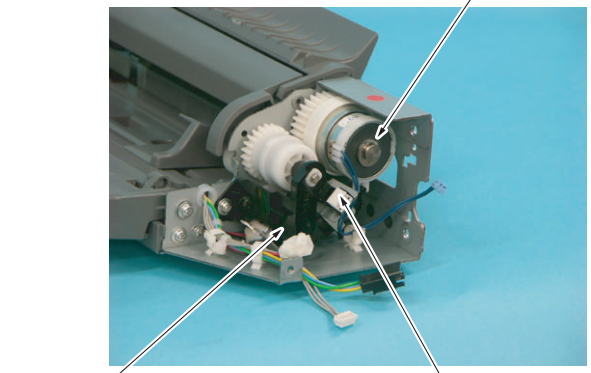
4038T2C112AA



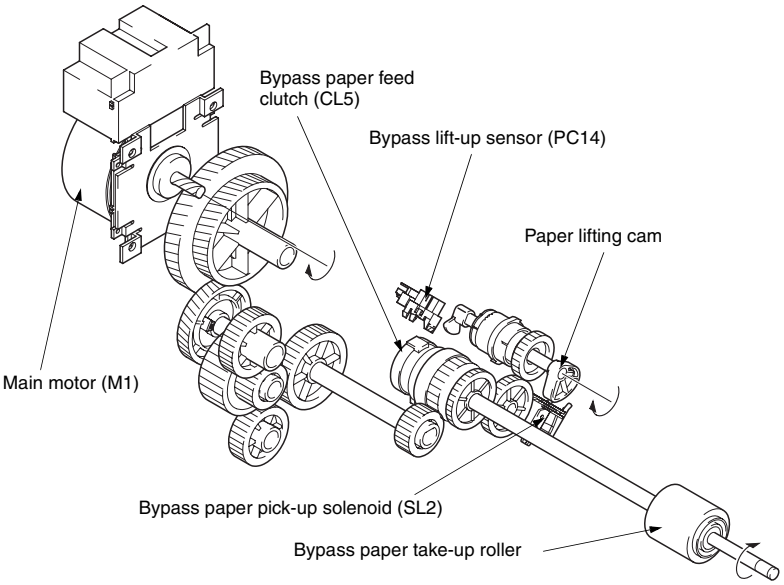
△2

4038T2C181AA

17.1 Drive

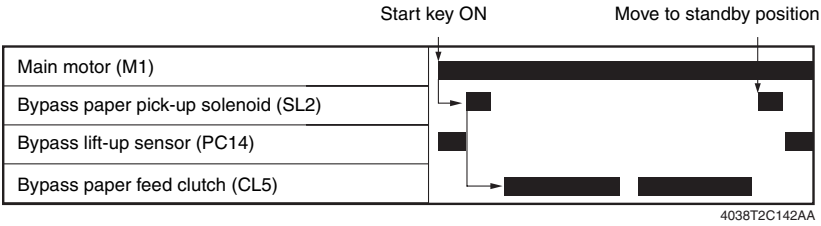

Bypass paper feed clutch (CL5)
Bypass paper pick-up solenoid (SL2)
4038T2C113AA
Bypass lift-up sensor (PC14)

1


Bypass paper feed clutch (CL5)
Bypass lift-up sensor (PC14)
Paper lifting cam
Main motor (M1)
Bypass paper pick-up solenoid (SL2)
Bypass paper take-up roller
4039T2C116AA

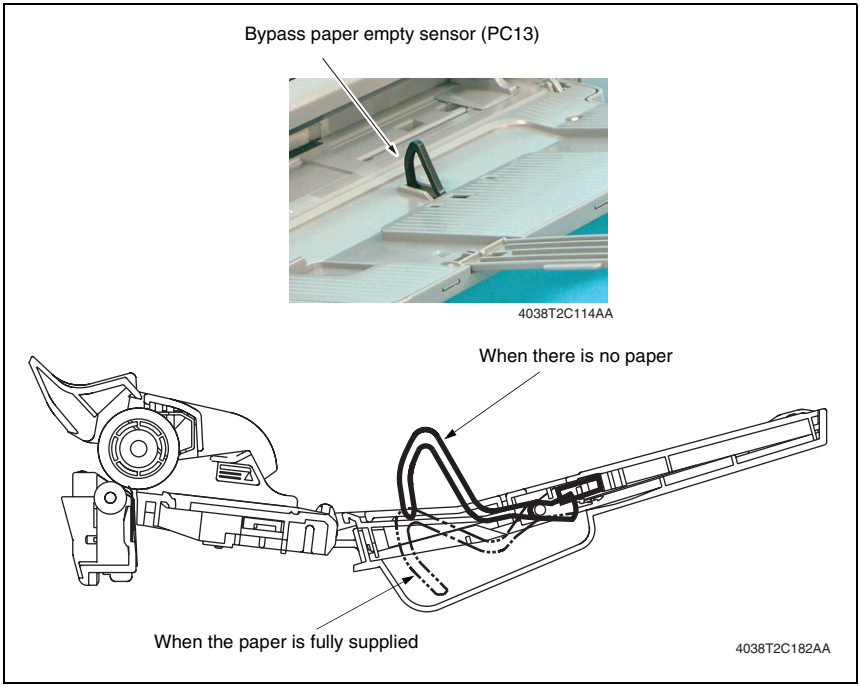
17.2 Operation

17.2.1 Bypass paper take-up control



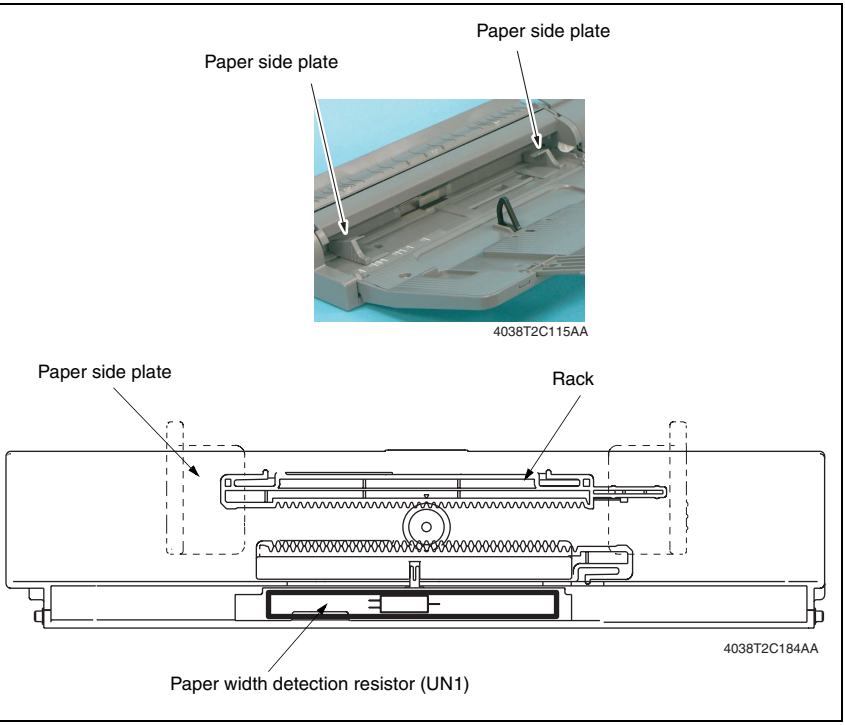
17.2.2 Paper empty detection

- The bypass paper empty sensor (PC13) detects a paper empty condition in the bypass section.



17.2.3 Paper width detection

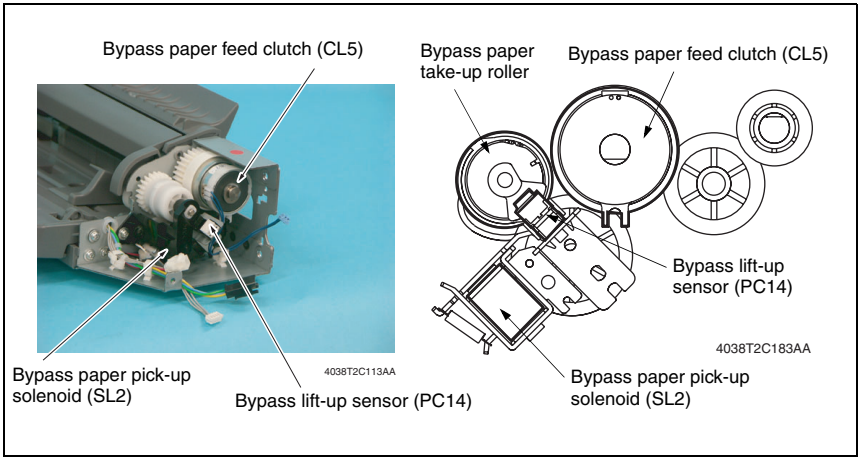
△2 • The paper width detection resistor (UN1) slides with the rack which moves simultaneously with the paper side guide plate. The output value indicated by the paper width detection resistor determines the paper width.
• “Size error” will be detected when the actual paper differs from the setting on the control panel.
- When the paper width is not correct
・ : It will not start feeding paper but will display “size error” on the panel.
- When the paper width is correct but the length is not
: It will start feeding paper. When the back-edge is detected, it will stop printing and display “paper jam.” “size error” will be displayed after the paper jam is cleared..

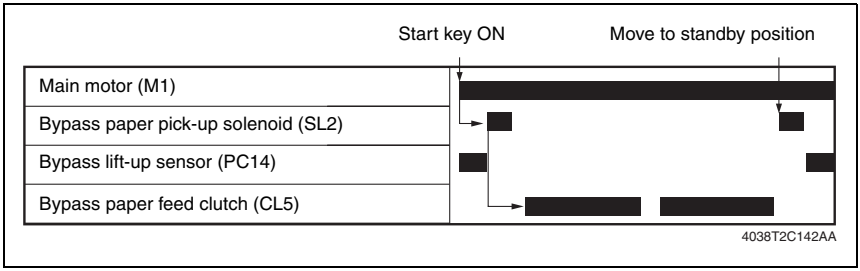


△2

17.2.4 Bypass paper lifting motion control

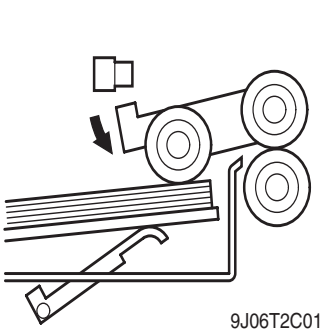
- It turns the bypass pick-up solenoid (SL2) ON when the bypass paper feed is started. The lifting cam will rotate to move the paper lifting plate up to the feeding position.
- When the printing is finished, the bypass pick-up solenoid (SL2) will be ON again. The paper lifting cam will then rotate to move the paper lifting plate down to the waiting position.
- The paper lifting plate will stay at the feeding position while the job is being executed. It will move down to the waiting position when the job is finished and no following printing is demanded.
- When the paper jam occurs, the paper lifting plate will move down to the waiting position.
- The position of the paper lifting plate is detected by the detection plate which is mounted coaxially with the paper lifting plate, and also by the bypass lift-up sensor (PC14).



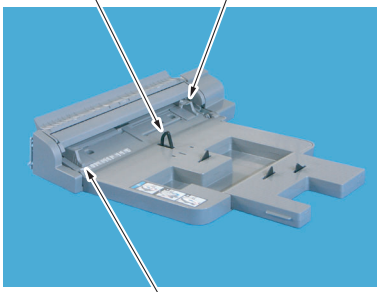


2 18. Bypass section (bizhub C252)

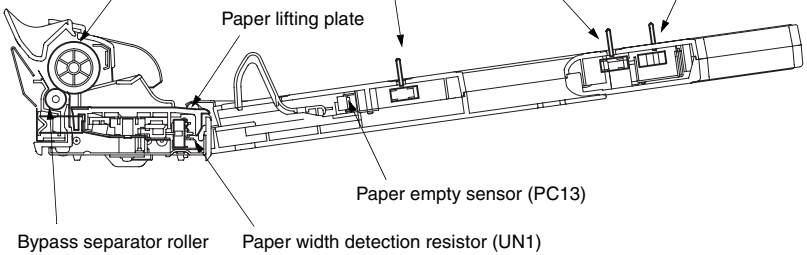
18.1 Composition



9J06T2C010DA

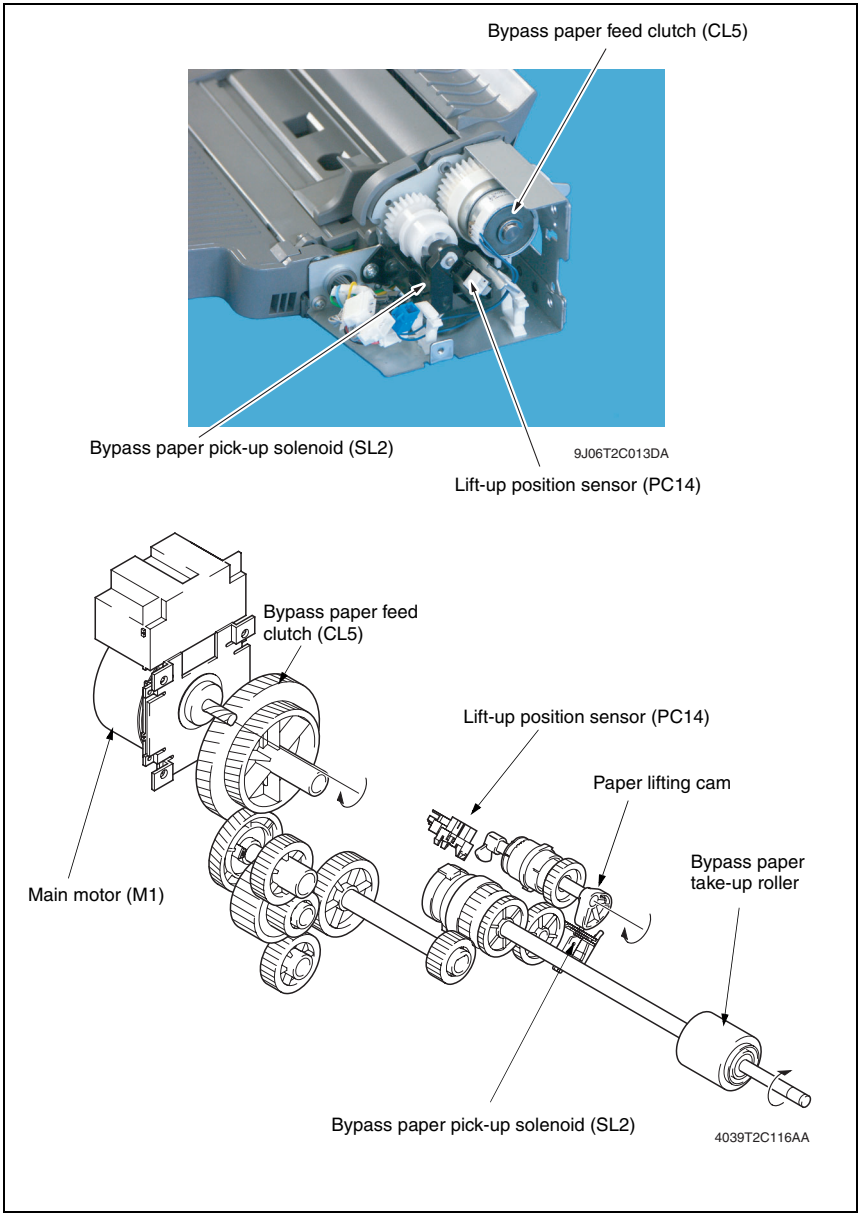


9J06T2C011DA


Bypass paper take-up roller
Multi FD size1 sensor (PC19)
Multi FD size2 sensor (PC20)
Multi FD size3 sensor (PC21)
Paper lifting plate
Paper empty sensor (PC13)
Bypass separator roller
Paper width detection resistor (UN1)

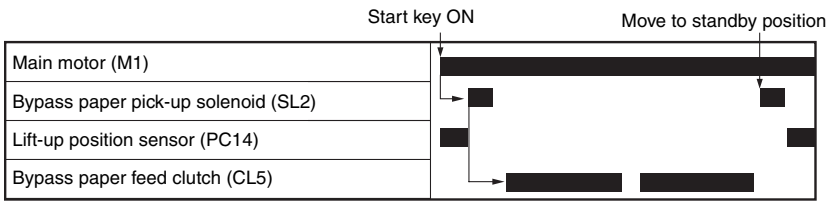
9J06T2C012DA

18.2 Drive


Bypass paper feed clutch (CL5)
Bypass paper pick-up solenoid (SL2)
9J06T2C013DA
Lift-up position sensor (PC14)
Bypass paper feed clutch (CL5)
Lift-up position sensor (PC14)
Paper lifting cam
Bypass paper take-up roller
Main motor (M1)
Bypass paper pick-up solenoid (SL2)
4039T2C116AA

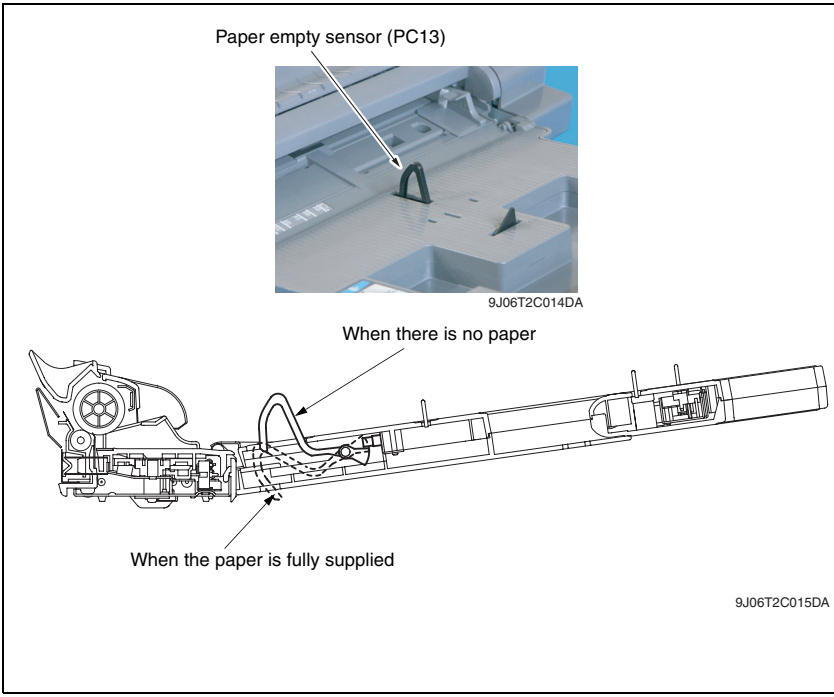
18.3 Operation

18.3.1 Bypass paper take-up control



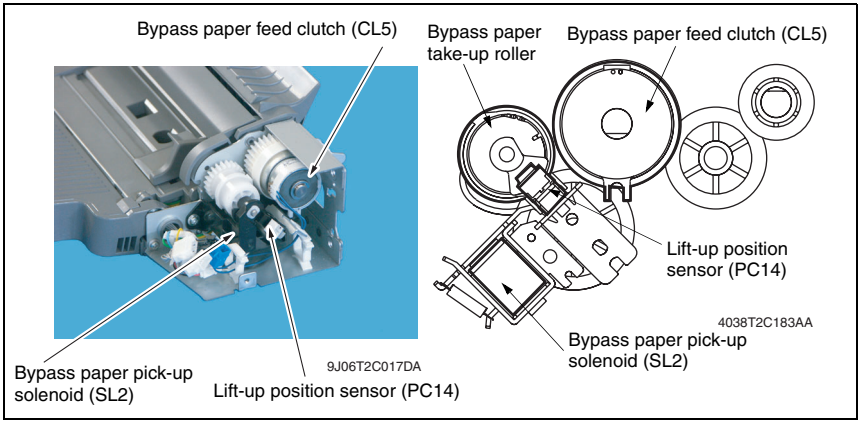
18.3.2 Paper empty detection

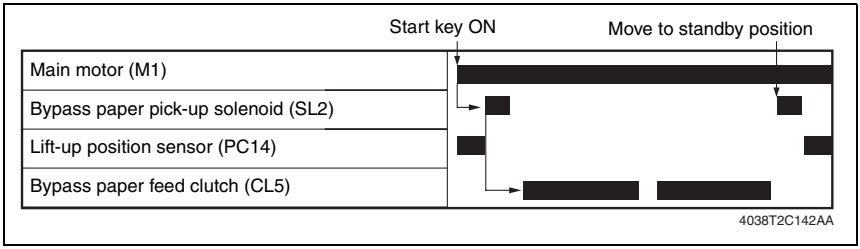
- The paper empty sensor detects a paper empty condition in the bypass section.



18.3.3 Bypass paper lifting motion control

- It turns the bypass paper pick-up solenoid ON when the bypass paper feed is started. The lifting cam will rotate to move the paper lifting plate up to the feeding position.
- When the printing is finished, the bypass paper pick-up solenoid will be ON again. The paper lifting cam will then rotate to move the paper lifting plate down to the waiting position.
- The paper lifting plate will stay at the feeding position while the job is being executed. It will move down to the waiting position when the job is finished and no following printing is demanded.
- When the paper jam occurs, the paper lifting plate will move down to the waiting position.
- The position of the paper lifting plate is detected by the detection plate which is mounted coaxially with the paper lifting plate, and also by the lift-up position sensor.





18.3.4 Paper size detection

- The size of the paper loaded in the bypass section is detected by the combination of ON or OFF positions of the three multi FD size sensors and the paper width detection resistor.
- Moving the paper guide varies the resistance value of the paper width detection resistor.

Metric area

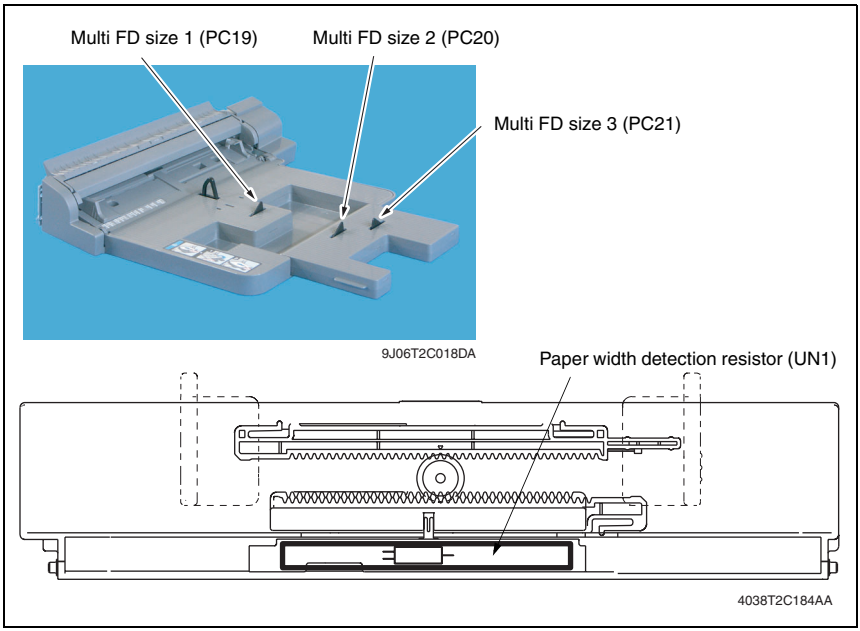
Multi FD size1 (PC19)	Multi FD size2 (PC20)	Multi FD size3 (PC21)	Paper width detection resistor (UN1) Width (mm)	Paper size detected
OFF	OFF	OFF	80 to less than 115	A6S
			115 to 144 inclusive	B6S
			196 to 225 inclusive	A5
			242 to 268 inclusive	B5
ON	OFF	OFF	133 to 164 inclusive	A5S
			169 to less than 196	B5S
			196 to 225 inclusive	A4S
			225 to less than 288	8-1/2 × 11
			288 to 330 inclusive	A4
ON	ON	OFF	188 to 235 inclusive	FLS*
ON	ON	ON	201 to 231 inclusive	8-1/2 × 14
			242 to less than 268	B4
			255 to less than 288	11 × 17
			288 to less than 301	A3
			301 to 330 inclusive	A3 wide

*: One of the following paper sizes can be selected to be set for FLS.
8 × 13, 8.125 × 13.25, 8.25 × 13, 8.5 × 13, 8.65 × 13

Inch area

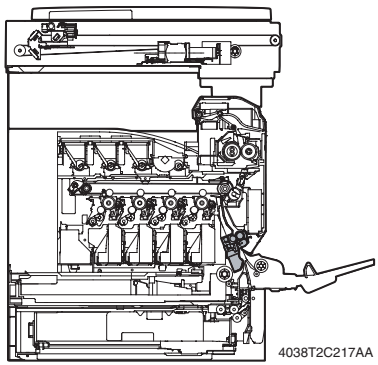
Multi FD size1 (PC19)	Multi FD size2 (PC20)	Multi FD size3 (PC21)	Paper width detection resistor (UN1)	Paper size detected
			Width (mm)	
OFF	OFF	OFF	80 to less than 115	A6S
			115 to 144 inclusive	B6S
			201 to 231 inclusive	5-1/2 × 8-1/2
			242 to 282 inclusive	7-1/4 × 10-1/2
ON	OFF	OFF	125 to 155 inclusive	5-1/2 × 8-1/2 S
			169 to less than 201	7-1/4 × 10-1/2 S
			201 to 231 inclusive	8-1/2 × 11 S
			225 to less than 288	8-1/2 × 11
			288 to 330 inclusive	A4
ON	ON	OFF	188 to 235 inclusive	Foolscap*
ON	ON	ON	201 to 231 inclusive	8-1/2 × 14
			242 to less than 268	B4
			268 to less than 288	11 × 17
			288 to less than 301	A3
			301 to 330 inclusive	A3 wide

*: One of the following paper sizes can be selected to be set for Foolscap.
8 × 13, 8.125 × 13.25, 8.25 × 13, 8.5 × 13, 8.65 × 13



19. Registration roller section

19.1 Composition



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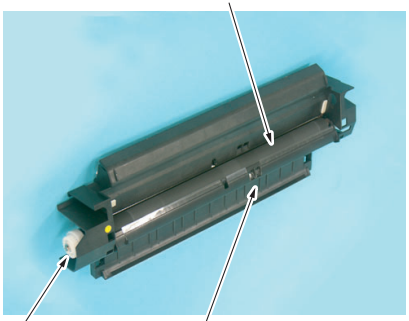
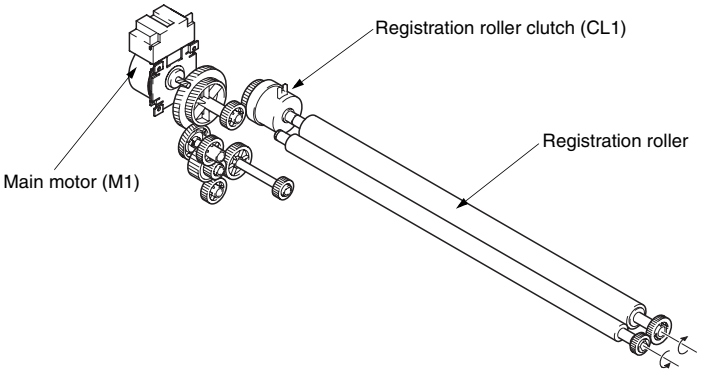


4038T2C118AA

19.2 Drive

2



4038T2C419AA

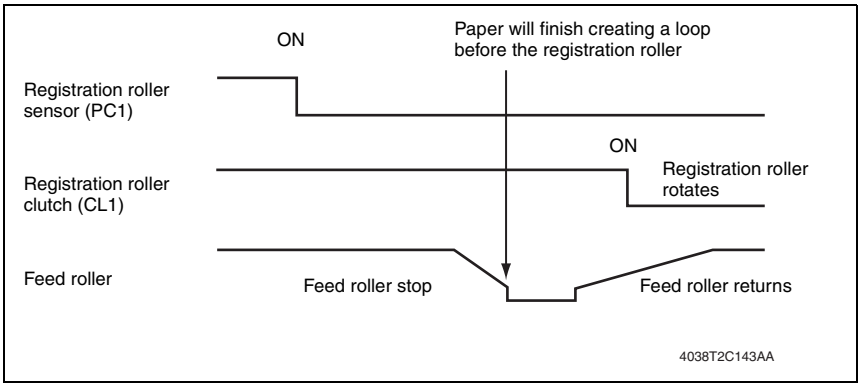
19.3 Operation

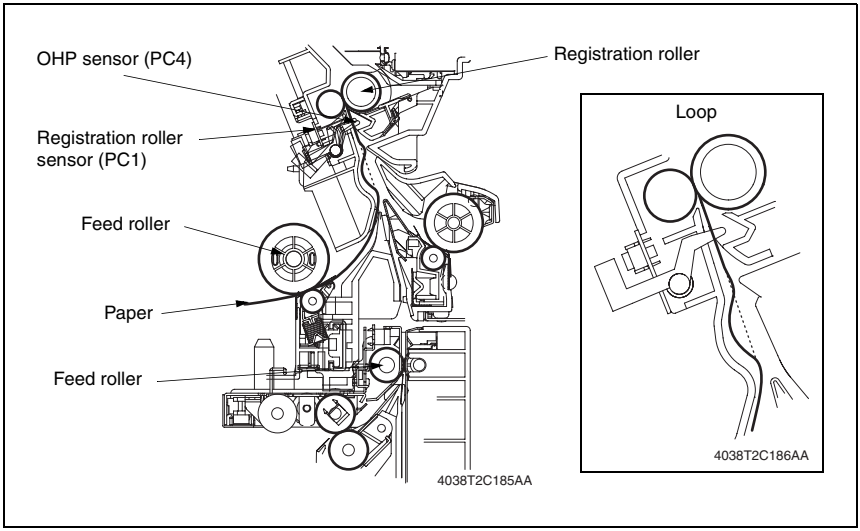
19.3.1 Registration roller control

- The paper will create a loop between the feed roller and the registration roller when the paper is being conveyed in order to correct the skew.
- The registration roller clutch (CL1) is controlled in order to synchronize the timing the unit starts writing the image and conveying paper.

A. Adjustment

- The amount of the loop of the paper can be adjusted in the “service mode.” changing the adjustment value will change the timing the feed roller turns ON.
- The timing of the paper conveyance can be adjusted in the “service mode.” changing the adjustment value will change the timing for the registration roller clutch (CL1) to turn ON..

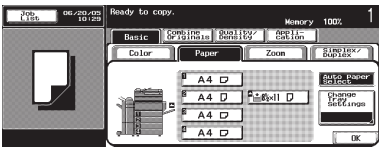




19.3.2 OHP detection

- OHP sensor (PC4) checks to prevent printing on the paper other than OHP.
- OHP detection will be performed after paper made the loop at the registration roller. When the OHP detection shows the different result from the setting on the operation panel, printing will stop to display “media error.”

Paper type set from control panel	Results of OHP sensor (PC4) detection	Operation
OHP	Other than OHP	Determines that there is mismatch of paper type, bringing all mechanisms to an immediate stop. “media error” will be displayed on the panel
Other than OHP	OHP	



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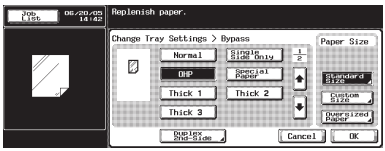

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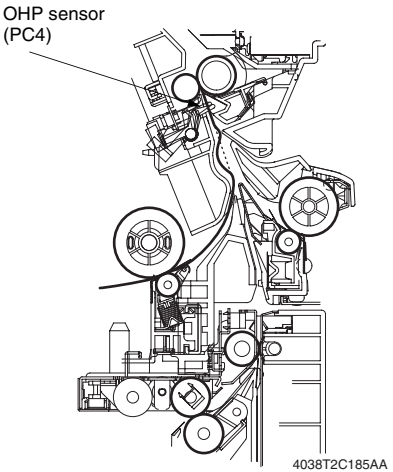

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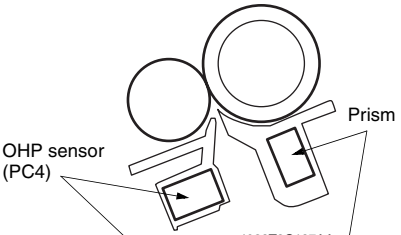

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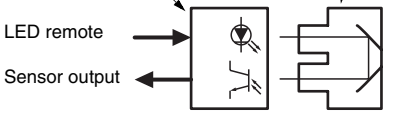

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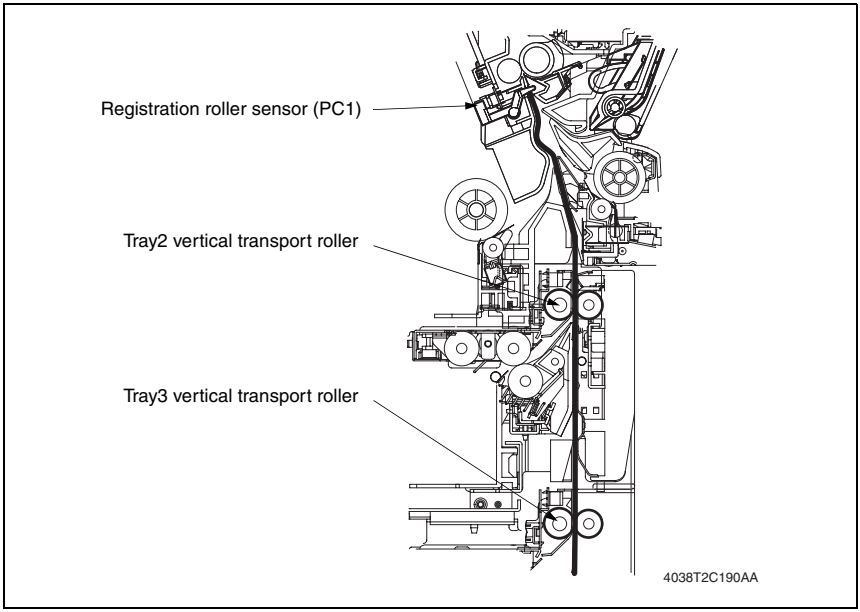
19.3.3 Deceleration control

- It controls the timing the paper reaches to the registration roller sensor (PC1).

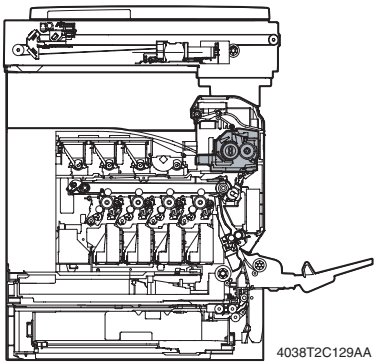
A. Operation

- The vertical transport motor (vertical transport roller) for each tray will slow down its operation in order to adjust the speed of the paper being conveyed.



20. Fusing section

20.1 Composition



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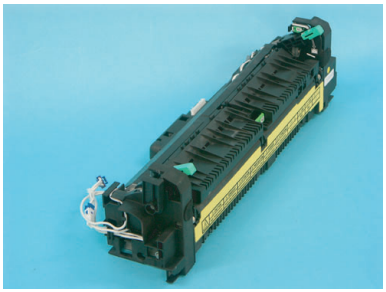

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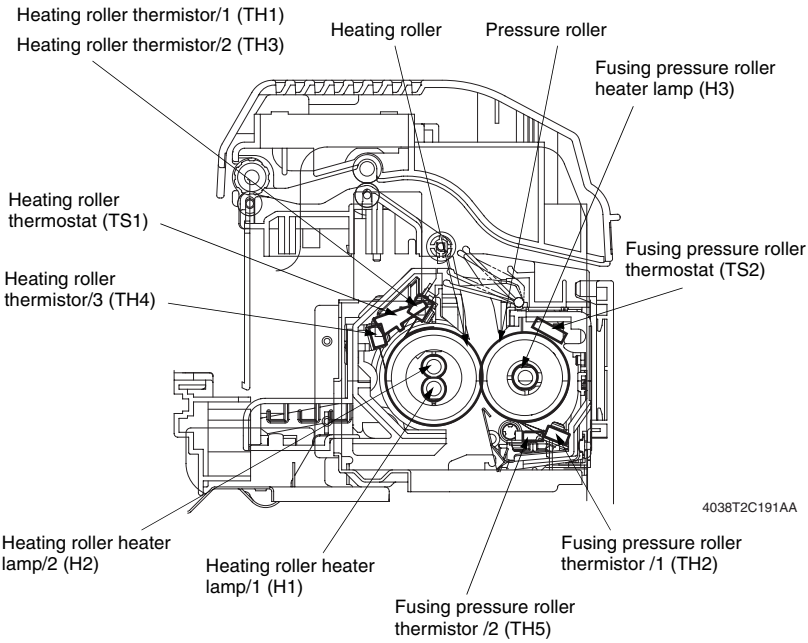
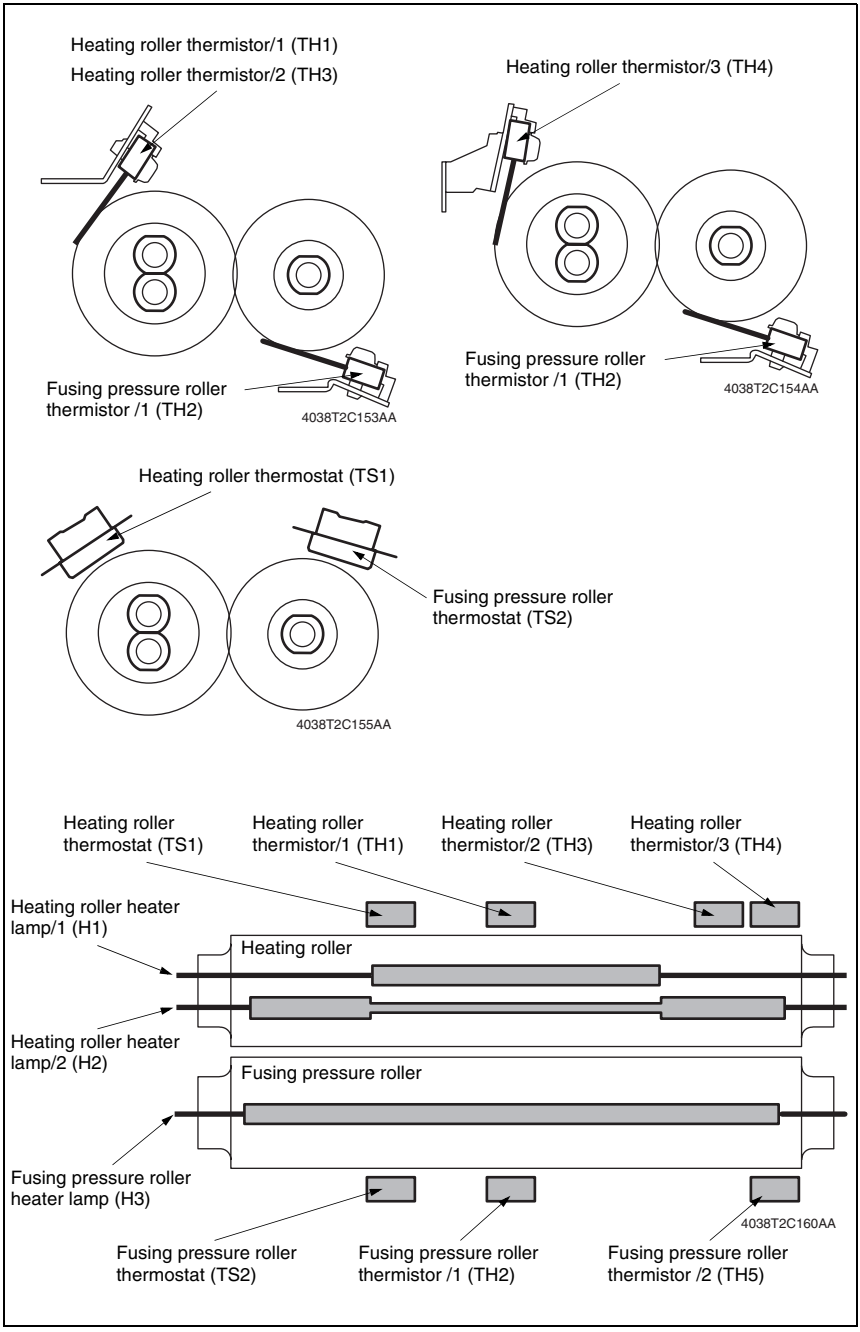
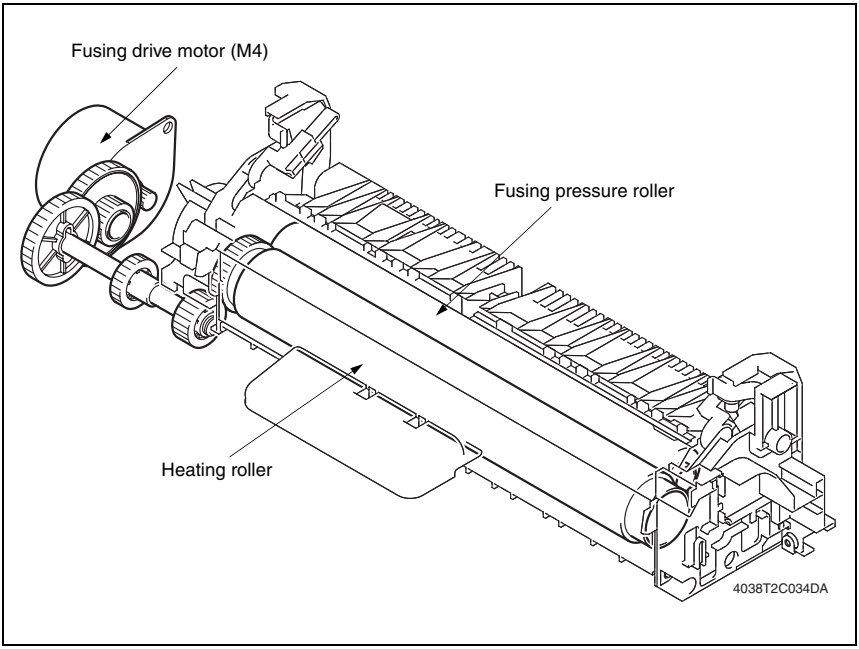

Heating roller thermistor/1 (TH1)
Heating roller thermistor/2 (TH3)
Heating roller
Pressure roller
Fusing pressure roller heater lamp (H3)
Heating roller thermostat (TS1)
Heating roller thermistor/3 (TH4)
Fusing pressure roller thermostat (TS2)
4038T2C191AA
Heating roller heater lamp/2 (H2)
Heating roller heater lamp/1 (H1)
Fusing pressure roller thermistor /2 (TH5)
Fusing pressure roller thermistor /1 (TH2)


Heating roller thermistor/1 (TH1)
Heating roller thermistor/2 (TH3)
Fusing pressure roller thermistor /1 (TH2)
4038T2C153AA
Heating roller thermistor/3 (TH4)
Fusing pressure roller thermistor /1 (TH2)
4038T2C154AA
Heating roller thermostat (TS1)
Fusing pressure roller thermostat (TS2)
4038T2C155AA
Heating roller thermostat (TS1)
Heating roller thermistor/1 (TH1)
Heating roller thermistor/2 (TH3)
Heating roller thermistor/3 (TH4)
Heating roller heater lamp/1 (H1)
Heating roller
Heating roller heater lamp/2 (H2)
Fusing pressure roller
Fusing pressure roller heater lamp (H3)
4038T2C160AA
Fusing pressure roller thermostat (TS2)
Fusing pressure roller thermistor /1 (TH2)
Fusing pressure roller thermistor /2 (TH5)

20.2 Drive


Fusing drive motor (M4)
Fusing pressure roller
Heating roller
4038T2C034DA

20.3 Operation

20.3.1 Fusing roller drive control

A. Fusing roller speed change control

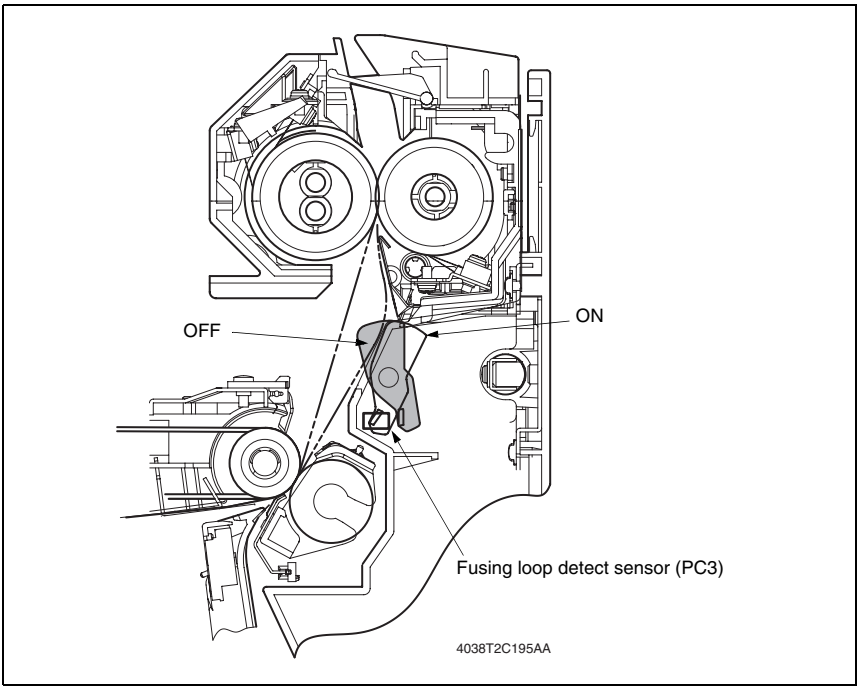
- The fusing roller (heating roller/fusing pressure roller) is driven by the fusing motor (M4). The fusing motor (M4) drives the heating roller. The fusing pressure roller rotates along with the heating roller.
- In order to avoid fusing error, the rotation speed of the fusing roller is to be set to one of 2 levels according to the paper type or the print mode.

Paper type/print mode	Fusing speed (mm/sec)
Plain paper/monochrome	111
Plain paper/color	111
Thick paper	55.5
OHP transparencies	55.5

Control	Fusing speed (mm/sec)
When checking the remaining paper	111
When the temperature of the fusing pressure roller reaches to the temperature the fusing drive motor starts rotating during warm-up.	111
Printing	System speed

B. Fusing loop control

- By creating a paper loop, the speed difference between the fusing and paper conveyance at 2nd transfer part will be adjusted. It prevents the double transferred image or brush effect.
- The fusing speed is set either to faster or slower than the system speed.
- The fusing loop detect sensor (PC3) checks the shape of a loop between the 2nd transfer part and the fusing roller to switch the motor clock as necessary. Switching the setting on the motor clock will change its rotation speed as well as the fusing roller's rotation speed to control how far the paper loop.



C. Operation flow

1. It starts controlling when the front-edge of the paper reaches to the predetermined position before the fusing roller.
2. The fusing speed will be low* (-2%) so the paper will create a loop between the 2nd transfer roller and the fusing roller.
3. When the paper loop more than specified, the fusing loop detect sensor (PC3) will be ON. The fusing speed will increase when the sensor turns ON. (+2%)
4. When the paper sags less than specified, the fusing loop detect sensor (PC3) will be OFF. The fusing speed will decrease when the sensor turns OFF. (-2%)
5. Operations explained above will keep the amount of the paper loop within specified range so the speed difference between the fusing and the paper conveyance for image transfer will be adjusted.
6. The fusing loop control will finish when the back-edge of the paper passes the predetermined position on the back of the transfer roller.

*: The fusing speed will not be low only with the envelopes. (to avoid wrinkles)

20.3.2 Heater lamp construction

- Three heater lamps are controlled to be turned ON/OFF so the temperature of the heating roller and the fusing pressure roller will stay appropriate to completely fuse the image.

A. Heating heater lamp construction

- The heating roller has two heaters with different heat quantities and light distributions.

Name	Symbol	Light emission	Function
Heating roller heater lamp/1	H1	Long	Light will emit to heat to the edge of the roller
Heating roller heater lamp/2	H3	Short	Light will emit to heat only the center of the roller

- When the temperature increases (temperature difference*) at the edge of the roller with the small size paper, the heater roller heater lamp will be switched from /1 (H1) to /2 (H3).
  * Temperature difference = Temperature detected by heating roller thermistor/2 - temperature detected by heating roller thermistor/1

Number of printing	Threshold temperature
The 1st sheet	- 30 degrees C
The 2nd sheet and after	- 4 degrees C

B. Fusing pressure heater lamp construction

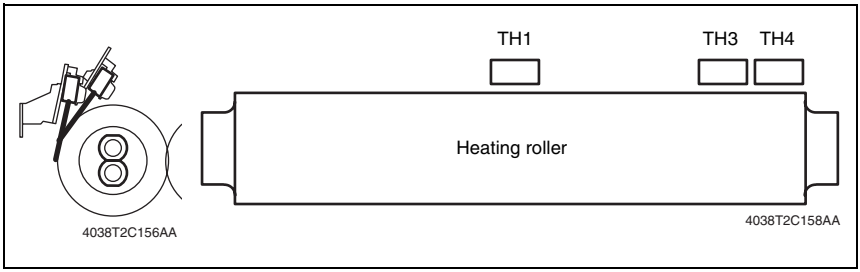
- The fusing pressure roller has the fusing pressure roller heater lamp (H2) to heat the roller itself.

20.3.3 Thermistor construction

- The fusing roller (heating/fusing pressure) has five thermistors. (three on the heating roller, two on the fusing pressure roller.)

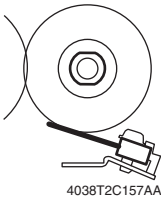
A. Heating roller thermistor

Name	Symbol	Function
Heating roller thermistor/1	TH1	The main thermistor which detects the temperature at the center of the heating roller
Heating roller thermistor/2	TH3	The sub-thermistor which detects the temperature at the edge of the heating roller
Heating roller thermistor/3	TH4	The protection thermistor which detects the abnormally high temperature of the heating roller



B. Fusing pressure thermistor

Name	Symbol	Function
Fusing pressure roller thermistor/1	TH2	The main thermistor which detects the temperature at the center of the fusing pressure roller
Fusing pressure roller thermistor/2	TH5	The protection thermistor which detects the abnormally high temperature of the fusing pressure roller



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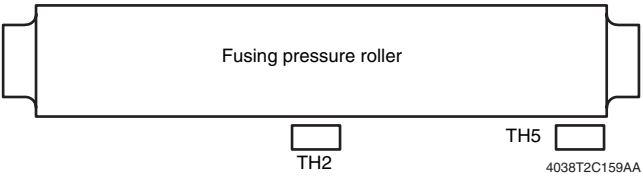

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20.3.4 Thermostat construction

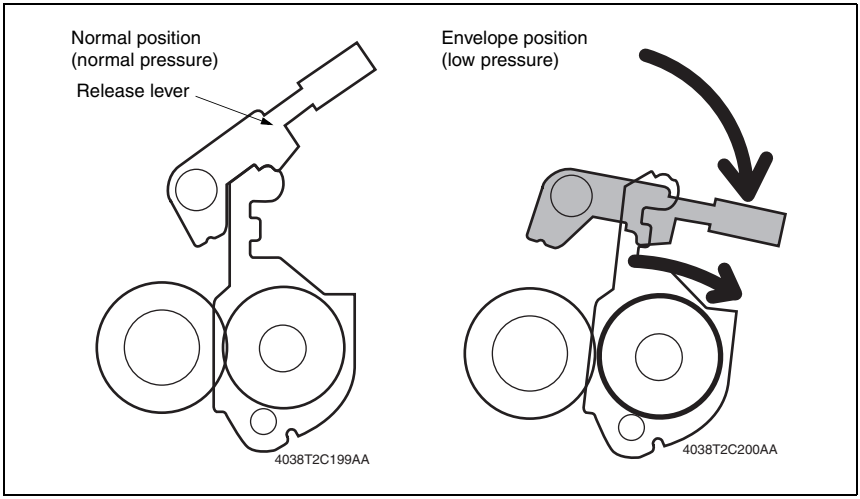
- The fusing drive roller has two thermostats. (one on the heating roller and one on the fusing pressure roller)
- When the temperature of the fusing roller increases abnormally high, the thermostat will detect it and shut down the power supplied to the heater lamp. This controls the high temperature protection/thermostat protection.

20.3.5 Fusing roller pressure/retraction mechanism

- The pressure roller is always pressed to the heating roller (normal position).
- By switching the release lever, the pressure of the fusing pressure roller can be switched between envelope position/paper jam countermeasure position.

A. Envelope position

- By switching the release lever to the lower direction shown below, the pressure of the fusing pressure roller will be envelope position.
- Envelope position is for preventing the wrinkle when feeding envelopes.
- To switch from envelope position to the normal position, move up the release lever to the normal position.

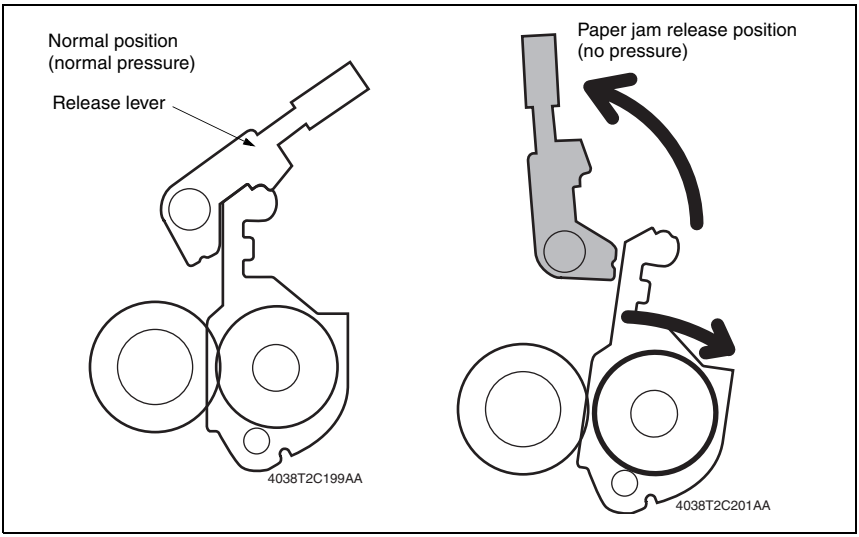


NOTE

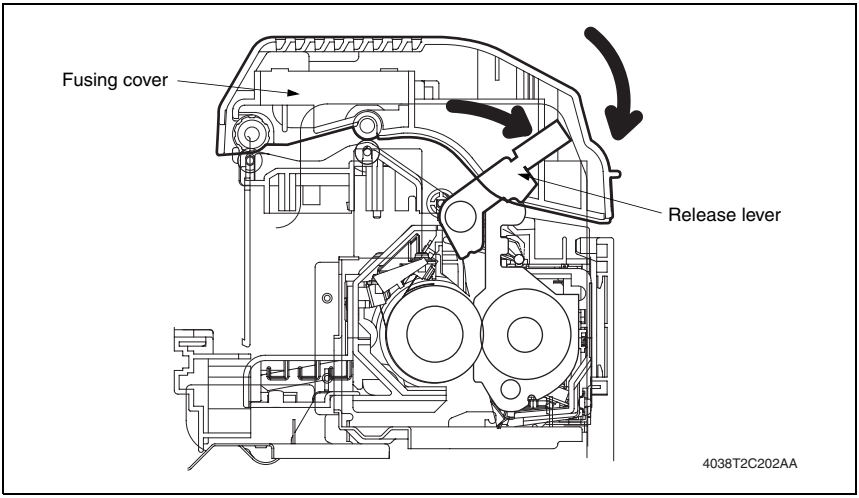
- **Leaving the unit for 30 days or more in normal position will deform the pressing part of the fusing pressure roller. Be sure to switch the fusing release lever to the envelope position when leaving the unit in normal mode for a long period of time.**
- **When the surface of the roller deforms, "uneven gloss" or other image troubles may occur when printing images of high density (high ID) such as photographs.**

B. Paper jam countermeasure position

- By switching the release lever to the position fusing pressure roller will retract from the heating roller as shown below.
- Paper jam release mechanism is equipped for removing the stuck paper.



- Close the fusing cover when switching the position from paper jam release to the normal. Closing the fusing cover will return the release lever to the normal position.

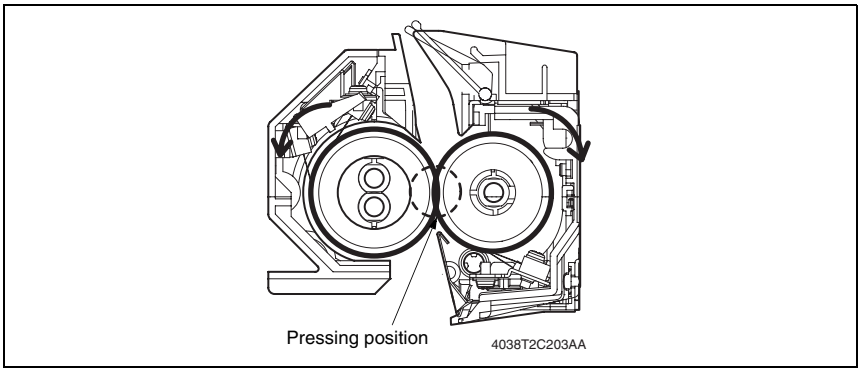


NOTE

- **The release lever must be closed by closing the fusing cover.**

20.3.6 Fusing roller small amount rotation control

- Leaving the fusing roller in low power mode for a long period of time will deform the pressing part of the fusing roller due to the heat and pressure. Deformed roller surface may cause “uneven gloss” or other image troubles when printing images with high density (high ID) such as photographs.
  Small amount rotation control is to prevent such image troubles.
- If a standby state or standby mode lasts for over three hours, the fusing roller will be rotated one tenth of a single rotation.

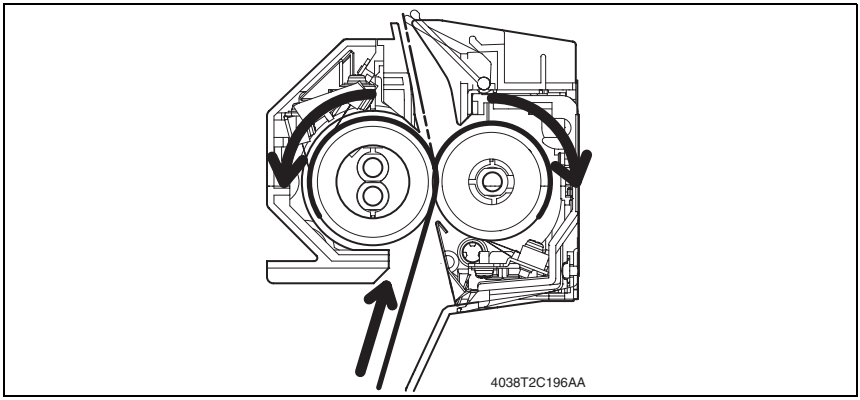


20.3.7 Paper winding detection control

- With the roller fusing type fusing unit, paper jam may cause the paper to wind itself to the fusing roller. This winding detection control monitors the paper to detect when it winds itself to the roller lightly so that it can be removed easily.

A. Operation

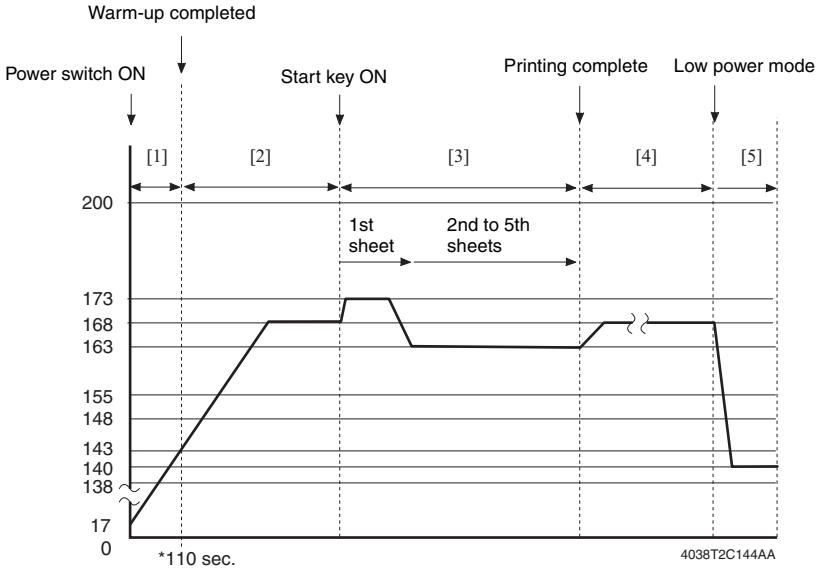
- It detects the winding before the roller is completely covered. (the length of the paper wound to the roller is shorter than the circumference of the roller.) The back-edge of the paper is sticking out from under the fusing unit and can be removed.
- The paper may wind itself both on the heating roller and the fusing pressure roller. Each roller is monitored to detect the possible winding.
- It is judged to be “heating roller paper winding C3A01/fusing pressure roller paper winding C3A02” when the temperature of the thermistor decreases for a certain amount compare to before the specified time.



- When the paper winding is detected, the unit will exceptionally stop.
  When other troubles occur, the unit will stop after the process to stop the unit.
  [The fusing drive motor (M4) needs to be rotated when going through this process.]
- When the paper jam occurs, rotating the fusing motor (M4) will make the paper stuck to the fusing roller even worse, so the unit will exceptionally stop immediately without the process for stopping the machine.

20.3.8 Fusing temperature control chart

When with plain paper, A4 paper (horizontal), single-side 5 sheets, and the temperature inside the unit is over 17 degrees C with main power ON



When turning the power ON in a stable condition with Main power ON/power OFF with rated voltage.

No.	Status		Target temperature setting	
			Heating roller (TH1)	Pressure roller (TH2)
[1]	Warming-up the unit (power is ON and the temperature inside the unit is more than 17°C)		143°C	140°C
	Warming-up the unit (power is ON and the temperature inside the unit is 17°C or less)		155°C	155°C
[2]	In standby state		168°C	168°C
[3]	Printing	Temperature control for the 1st copy	173°C	173°C
		Temperature control for the 2nd to 5th copies	163°C	163°C
		Temperature control for the 6th to 15th copies	155°C	155°C
		Temperature control for the 16th to 50th copies	148°C	143°C
		Temperature control for the copies after 50th copy	148°C	138°C
[4]	In standby state		168°C	168°C
[5]	Low power mode		140°C	140°C

.

20.3.9 Warm-up control

- There are two modes for the warm-up control depending on the temperature inside the unit at the beginning of the warm-up.
- The temperature inside the unit is determined by the temperature three minutes after the warm-up has started.

Temperature inside the unit at the beginning of the warm-up	More than 17°C	17°C or less

A. When the temperature inside the unit is more than 17°C at the beginning of the warm-up

- Target control temperature

Name	Symbol	Target control temperature
Heating roller thermistor/1	TH1	168°C
Fusing pressure roller thermistor/1	TH2	168°C

· Conditions for completing the warm-up.

Name	Symbol	Conditions for completing the warm-up	
Heating roller thermistor/1	TH1	When the temperature reached 143°C	• Temperature will be controlled up to 168°C for both TH1 and TH2 when no printing is demanded.
2 Fusing pressure roller thermistor/1	TH2	When the temperature reached 140°C	• When the printing is demanded during the temperature control for between 143 and 168°C, the print temperature control will start.

B. When the temperature inside the unit is 17°C or under at the beginning of the warm-up.

- Target control temperature

Name	Symbol	Target control temperature
Heating roller thermistor/1	TH1	168°C
Fusing pressure roller thermistor/1	TH2	168°C

- Conditions for completing the warm-up

Name	Symbol	Conditions for completing the warm-up	
Heating roller thermistor/1	TH1	When the temperature reached 155°C	• Temperature will be controlled up to 168°C for both TH1 and TH2 when no printing is demanded.
Fusing pressure roller thermistor/1	TH2	When the temperature reached 155°C	• When the printing is demanded during the temperature control for between 155 and 168°C, the print temperature control will start.

20.3.10 Temperature control during low power mode

- The temperature control is performed at the lower temperature in order to save the power consumption during standby state.

A. Contents of control

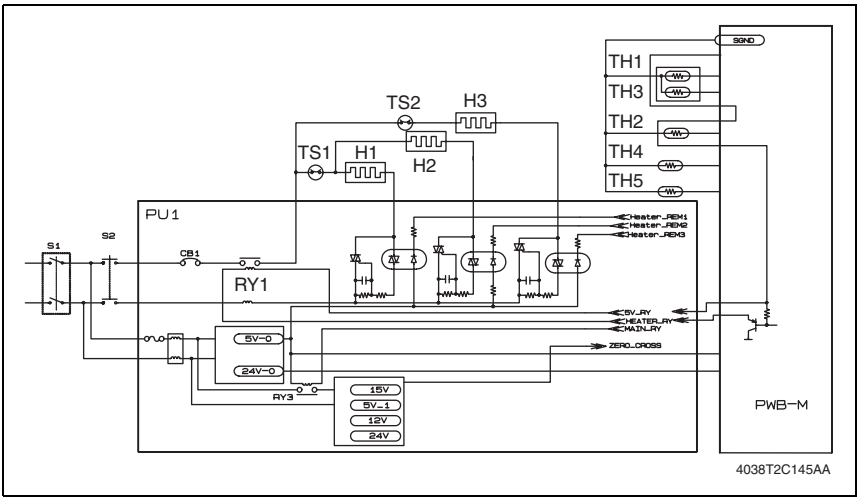
- Target control temperature

Name	Symbol	Target control temperature
Heating roller thermistor/1	TH1	140°C
Fusing pressure roller thermistor/1	TH2	140°C

20.3.11 Protecting from the abnormally high temperature

The machine provides protection against abnormally high temperature of the fusing unit in the following three steps.
Details for each control are described in the following sections.

Level	Name	Control
Level 1	Software protection	• It detects the high temperature troubles which most likely occur. • When the heating roller thermistor/1 and the fusing pressure roller thermistor/1 detect abnormally high temperature, the trouble code for the abnormally high temperature will be displayed, and the printing will be prohibited.
Level 2	Hardware protection	• When the level 1 protect is not executed for some reason, level 2 protect will be performed. • When the heating roller thermistor/3 and fusing pressure roller thermistor/2 detect abnormally high temperature, the heater lamp relay will be forced to be OFF, and will shut down power supply for each heater lamp. • When the heater relay stays OFF for specified period of time, the trouble code for the abnormally high temperature will be displayed, and the printing will be prohibited.
Level 3	Thermostat protection	• When the level 2 protect is not executed for some reason, level 3 protect will be performed. • When the soft protect or hard protect control is not executed for some reason such as malfunction of the thermistor, the heating thermostat/fusing pressure thermostat will detect the abnormally high temperature and the power for each heater lamp will be OFF.



20.3.12 Abnormally high temperature detection (software protection)

- It detects when the temperature of the heating roller and the fusing pressure roller increase abnormally high. It informs the error and stops the operation.

A. Detection condition

- When conditions below are protected, it will be judged as "heating roller abnormally high temperature C3751/fusing pressure roller abnormally high temperature C3752."

Control	Thermistor	Symbol	Set temperature
When the temperature of TH1 and TH3 goes above specified degree and stays for more than one second, the fusing temperature will be judged to be abnormally high (heating heater.)	Heating roller thermistor/1	TH1	222°C
	Heating roller thermistor/2	TH3	
When the temperature of TH2 goes above specified degree and stays for more than one second before the fusing temperature control starts, the fusing temperature will be judged to be abnormally high (fusing pressure heater.)	Fusing pressure roller thermistor/1	TH2	222°C
When the temperature of TH2 goes above specified degree and stays for more than one seconds after the fusing temperature control has started, the fusing temperature will be judged to be abnormally high (fusing pressure heater.)	Fusing pressure roller thermistor/1	TH2	222°C

20.3.13 Abnormally high temperature detection (hardware protection)

- It forces the heater relay to be OFF to turn the heater lamp OFF when the high temperature trouble cannot be detected due to CPU run away.
- It will be judged as "fusing unit abnormally high temperature (heating heater) C3751" when detecting the heater relay OFF.
- Power supplied to the heater lamps can be shut off before the thermostat operates. It protects the fusing unit from being damaged.

A. Heater lamp OFF control

Control	Thermistor	Symbol	Specified temperature by the comparator
When the temperature of TH4 and TH5 go over the temperature by the comparator, the comparator (circuit) on the mechanical control board will turn the heater lamp relay of the DC power unit OFF, to shut power off for each heater lamp.	Heating roller thermistor/3	TH4	232°C
	Fusing pressure roller thermistor/2	TH5	

B. Heater lamp relay OFF detection control

- The thermistor detects the comparator, and turns heater lamp relay OFF.
- When the heater lamp relay turns OFF, it stays OFF.
- When the heater lamp relay stays OFF, the OFF signal will be entered.
- When the OFF signal is entered and stays for more than specified period of time, it is judged to be the fusing unit abnormally high temperature (heating heater.)

C. When to start controlling

- It always watches the heater lamp relay OFF signal.

20.3.14 High temperature error detection (thermostat protection)

- When the software protection or hardware protection control is not executed due to the thermistor malfunction, etc., power for each heater lamp will be shut off by heating thermostat/fusing pressure thermostat.

Thermostat	Symbol	Rated temperature	Roller surface temperature's presumption figure
Heating thermostat	TS1	179°C	About 350°C
Fusing pressure thermostat	TS2	171°C	About 350°C

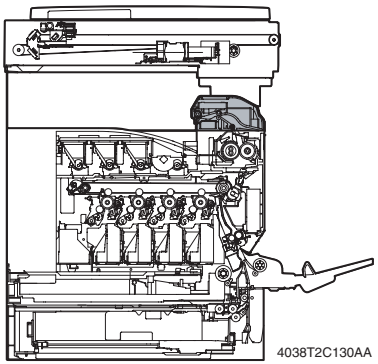
*: Thermostats are mounted without contacting with rollers. The actual temperature on the roller surface differs from the indicated value.

20.3.15 Detection of a new fusing unit

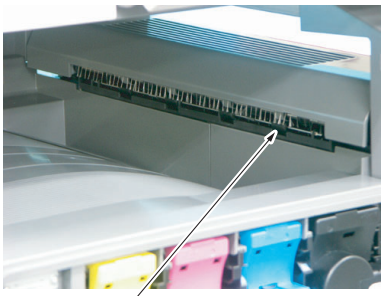
- When a new fusing unit is installed in the machine, the life counter is automatically cleared through the machine's capability of detecting a new fusing unit.
- The new fusing unit will be detected when the sub-power is ON.

21. Paper exit section

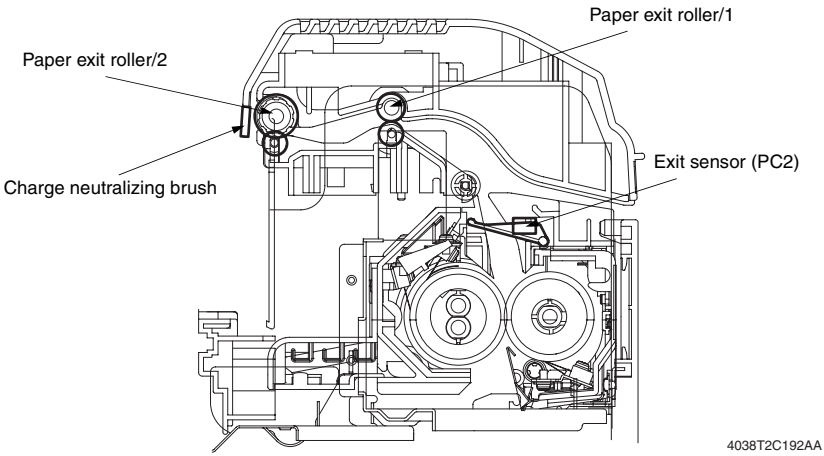
21.1 Composition



4038T2C130AA

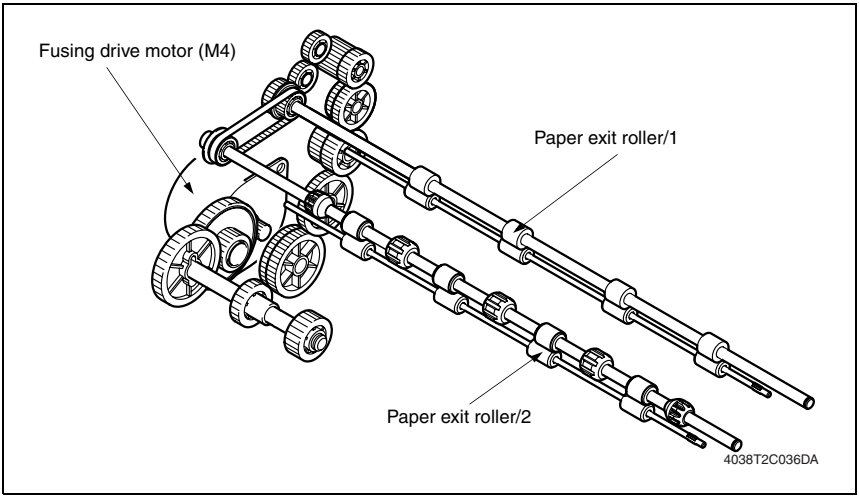


4038T2C120AA



4038T2C192AA

21.2 Drive


Fusing drive motor (M4)
Paper exit roller/1
Paper exit roller/2
4038T2C036DA

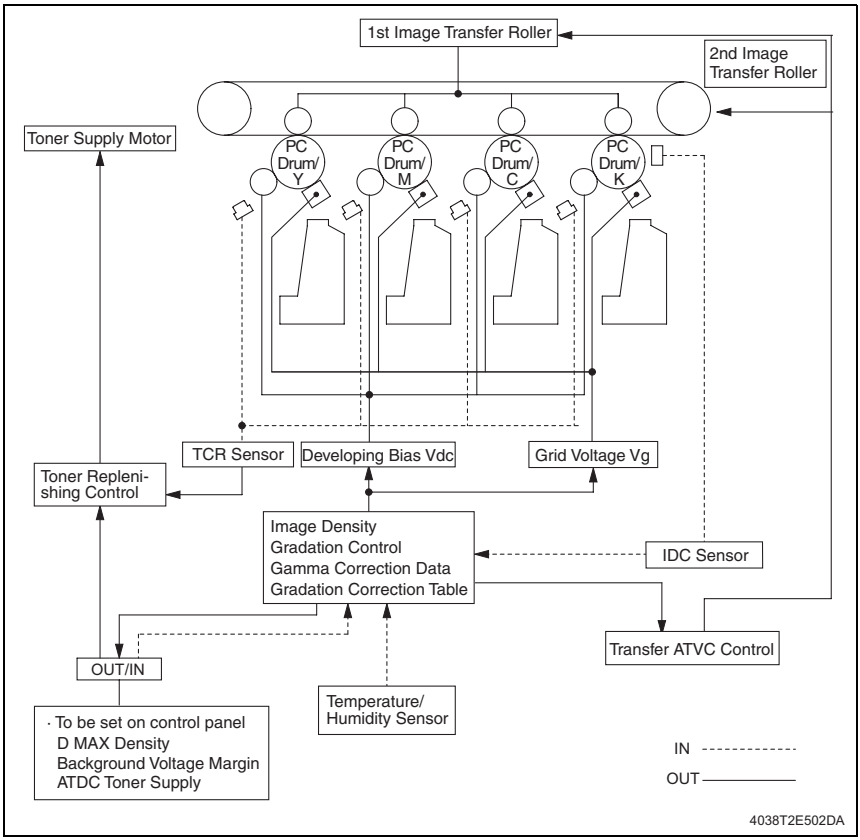
22. Image stabilization control

22.1 Overview

- The machine provides the following image stabilization control to ensure stabilized copy image.

Purpose	Control	Control means
To stabilize image density To stabilize gradation	• IDC intensity control • Max. density control • LD intensity adjustment control • Registration control (color shift correction) • Gamma correction control	IDC/registration sensor temperature/humidity sensor
To stabilize toner density	* TCR control (Y,M,C,K)	TCR sensor
To stabilize image transfer	* Image transfer output control 1st image transfer ATVC 2nd image transfer ATVC	Temperature/humidity sensor

An explanation is given of the control for each section.



22.2 Operation

22.2.1 IDC intensity control

- Controls changes in characteristics due to change with time and contamination of the transfer belt and IDC/registration sensor, part-to-part variations in the sensors, and change of environment.
- The intensity (current value) of the IDC/registration sensor is adjusted on the surface of the transfer belt, on which no toner sticks (background level).

22.2.2 Max. density control

- The developing bias (Vdc) is adjusted to control changes in the solid density resulting from variations in developing characteristics and IDC/registration sensor intensity, variations in sensitivity of the PC drum, and changes in the environment, durability, and the amount of charge in toner.
- Patterns are produced on the surface of the transfer belt and the IDC/registration sensor detects the amount of toner sticking to them.
- Referring to the detected data and the environment data taken by the temperature/humidity sensors, the developing bias value that results in the appropriate maximum density is calculated and stored in memory.
- Thereafter, the grid voltage (Vg) value, including the background margin adjustment value, is calculated and stored in memory.

22.2.3 LD (laser diode) intensity adjustment control

- It adjusts the variation in reproducibility of the thin line and the reverse outline, which is resulting from the variations in electrostatic characteristics of the PC drum, developing characteristics and transfer characteristics in terms of individual difference, environment and durability, to make it the target level.
- It produces detection patterns on the surface of the transfer belt with the given level of LD intensity and detects the output value of IDC sensor.
- LD intensity is calculated from the detected IDC sensor data.

22.2.4 Gamma correction control

- The intensity of LD in all gradation levels is adjusted to correct changes in gradation characteristics to a linear one. The changes in gradation characteristics are caused by variations in the PC drum sensitivity and developing characteristics and changes with time and in environment.
- It produces gradation patterns on the transfer belt and calculates gradation characteristics output by the current engine with the IDC/registration sensor.
- The gamma correction data is calculated using the density measurements of different gradation levels. The optimum LED intensity is set for each of the different gradation levels

22.3 Operation timing

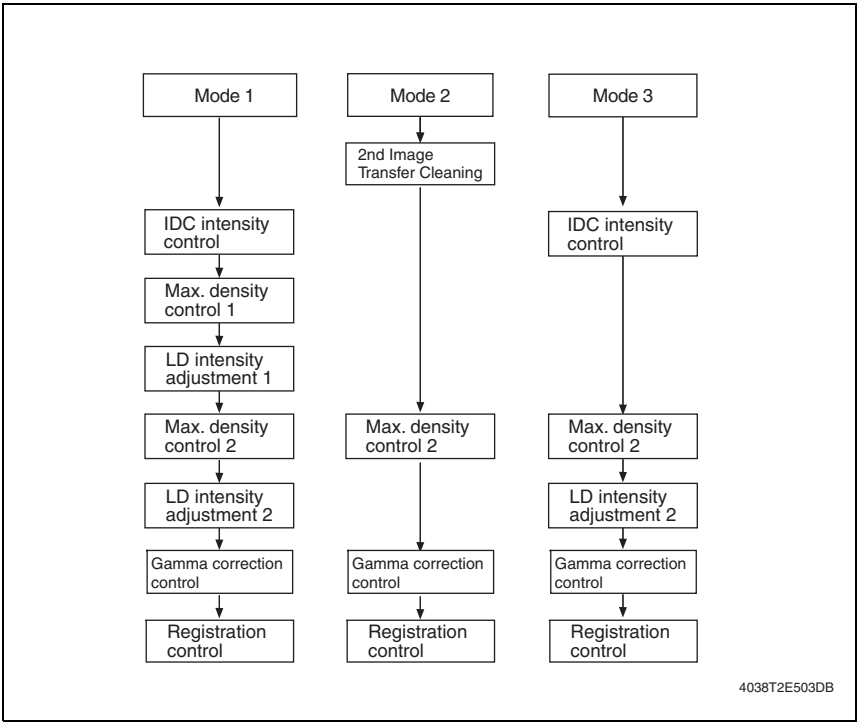
Mode	Operation timing
Mode 1	A new IU is detected; a new transfer belt unit is detected; panel displays initialization and stabilization mode.
Mode 2	The number of copies made exceeds “140 counts” after the previous image stabilization (mode 1, 2, 3.)
Mode 3	Power switch is turned ON; right door is opened and closed; front door is opened and closed; sleep mode is reset; panel displays stabilization mode. The number of copies made exceeds “280 counts” after the previous image stabilization (mode 1, 3.) When the number of copies made exceeds threshold “140 counts” after the previous image stabilization (mode 1, 2, 3.), temperature change that exceeds threshold *1 is detected. When the number of copies made exceeds threshold “140 counts” after the previous image stabilization (mode 1, 2, 3.), environment (temperature/humidity) change that exceeds threshold is detected. When the print job is completed, given level of temperature change *1 is detected. When the print job is completed, environment (temperature/humidity) change that exceeds threshold is detected after the previous stabilization (mode 1, 2, 3.)

⚠1

A copy of A4 size or equivalent is counted as one.
Paper length is 216 mm or under: 1 count
Paper length exceeds 216 mm: 2 counts

*1 Temperature change threshold
The temperature entered previously was 20 degree celsius or under: threshold ± 1 degree
The temperature entered previously exceeded 20 degree celsius: threshold ± 2 degree

22.4 Operation flow

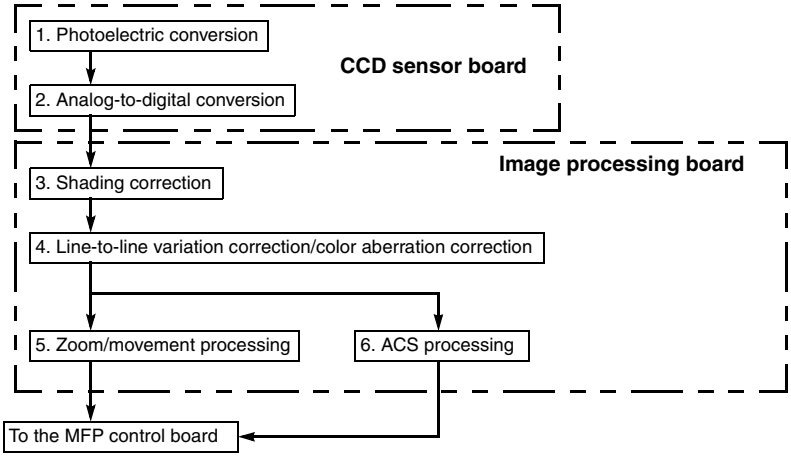


* The ATVC control is performed simultaneously with the IDC intensity control.
* Max. density control 1: Use default for characteristic tilted value and Vdc value.
  Max. density control 2: Use previous setting value for characteristic tilted value and Vdc value.

* LD (laser diode) intensity adjustment control 1:
  Use default for LD intensity for adjustment pattern.
  LD (laser diode) intensity adjustment control 2:
  Use previous setting value for LD intensity for adjustment pattern.

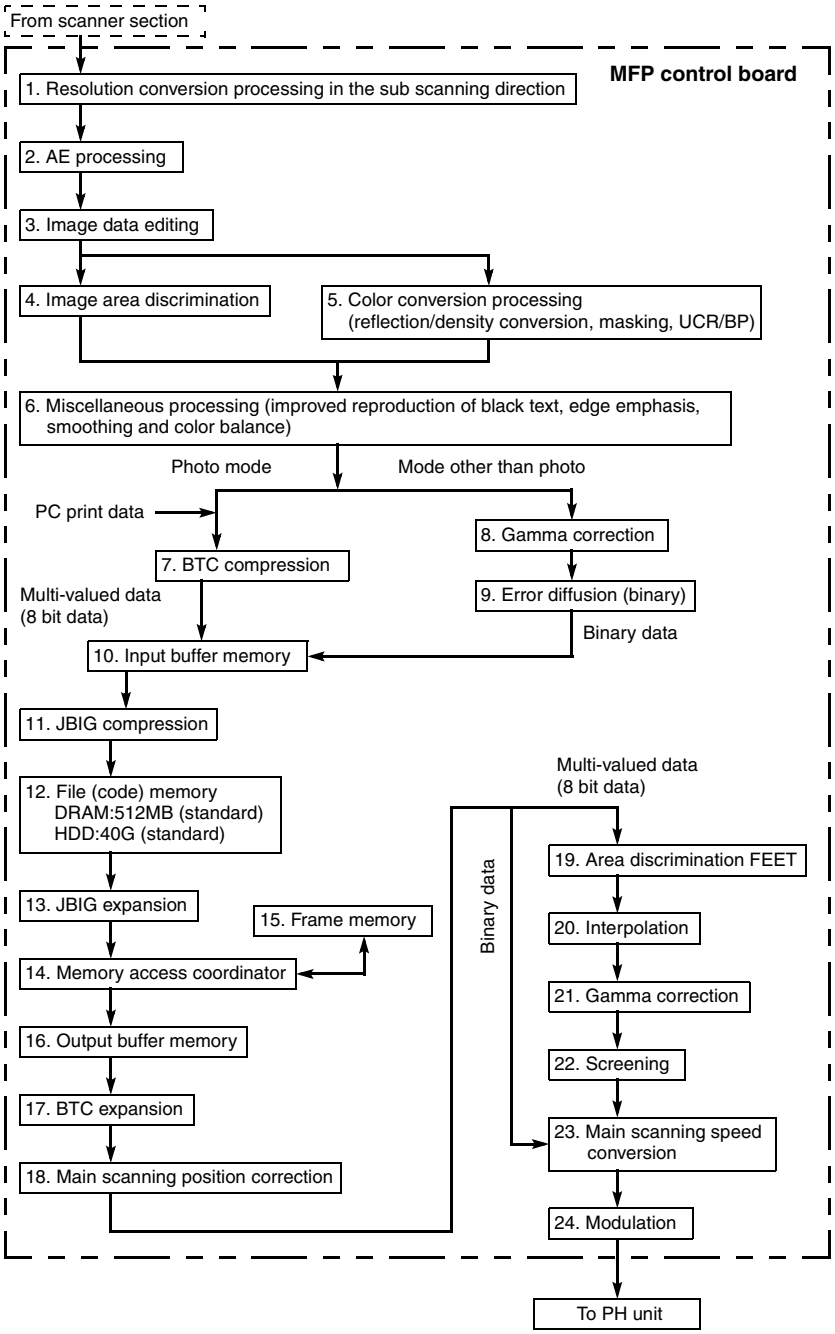
23. Image processing

23.1 Scanner section image processing block diagram



- The following detail the image processing operations performed by the scanner section.
  1. A reduction type CCD sensor is used to read the light reflected off the original and convert the optical data to a corresponding electric signal. To make data processing faster, data transfer and output are done through two channels, one for even-numbered pixels and the other for odd-numbered pixels.
  2. The odd and even analog signals output from the CCD sensor chips are synthesized to form a single string of signal data which is in turn converted to 8-bit digital signals (256 gradation levels).
  3. A correction is made of errors that occur due to variations in sensitivity of each CCD chip and the light distribution varying along the length of the exposure lamp. The shading correction is made by holding the peak value, i.e., the maximum value of readings taken of multiple lines, to prevent adverse effects on the image due to dust on the shading sheet.
  4. Memory called FIFO is employed to compensate for a deviation in the scanning position of the original, which represents a gap between two adjacent CCD chips, thereby matching the output timing of R, G, and B data. Also, the color aberration of the lens is compensated at this time.
  5. FIFO memories are used to enlarge or reduce the image. The image is enlarged by increasing the number of data readings and reduced by decreasing the number of data readings.
  6. The scanning are is divided into multiple blocks. The ratio of color or monochrome is calculated for each of these blocks. The machine then determines whether the entire original is colored or monochrome. A histogram of lightness is also created for later AE processing.
- The image data is transmitted to MFP control board on the write section through the interface cable

23.2 Write section image processing block diagram


From scanner section
MFP control board
1. Resolution conversion processing in the sub scanning direction
2. AE processing
3. Image data editing
4. Image area discrimination
5. Color conversion processing (reflection/density conversion, masking, UCR/BP)
6. Miscellaneous processing (improved reproduction of black text, edge emphasis, smoothing and color balance)
Photo mode
Mode other than photo
PC print data
7. BTC compression
8. Gamma correction
9. Error diffusion (binary)
Multi-valued data (8 bit data)
Binary data
10. Input buffer memory
11. JBIG compression
12. File (code) memory DRAM:512MB (standard) HDD:40G (standard)
13. JBIG expansion
15. Frame memory
14. Memory access coordinator
16. Output buffer memory
17. BTC expansion
18. Main scanning position correction
Multi-valued data (8 bit data)
Binary data
19. Area discrimination FEET
20. Interpolation
21. Gamma correction
22. Screening
23. Main scanning speed conversion
24. Modulation
To PH unit

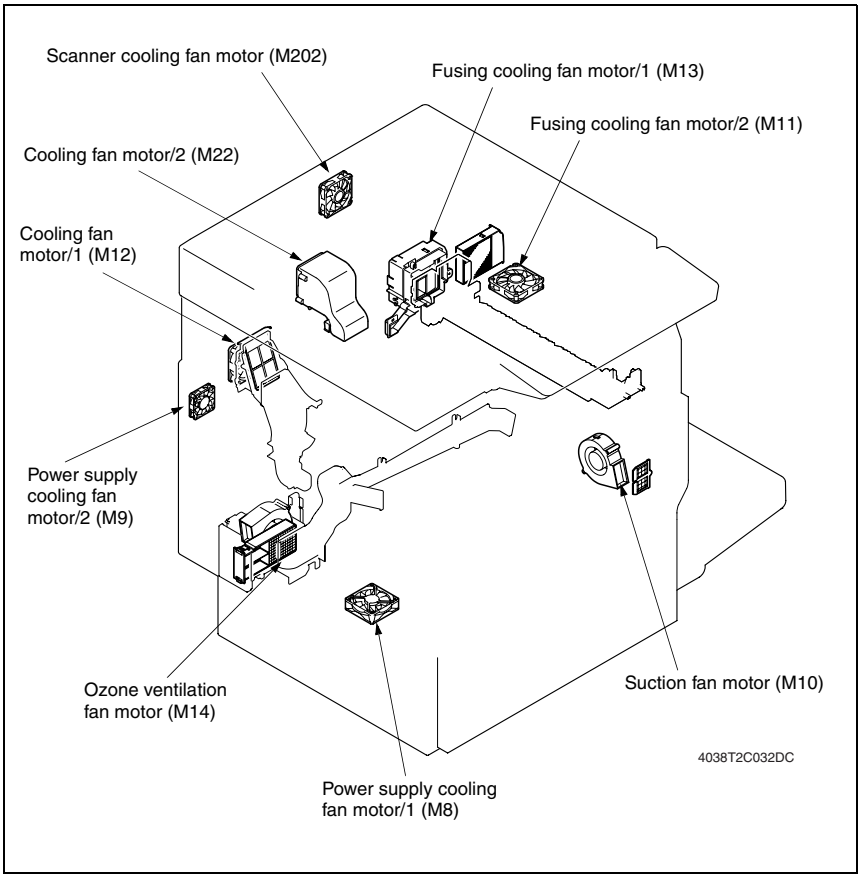
- The following detail the image processing operations performed by MFP control board on the write section.
  1. Reduction processing is conducted in sub scanning direction. no processing is done at same size or zoom, but at reduction, the lines are thinned out.
  2. The scanning area is divided into two in the FD direction. The lightness histogram for AE processing is generated by the lightness histogram generated through ACS processing. The AE level of the original is determined based on this histogram and AE processing is performed.
  3. R, G, and B data are then converted to value and color component data for adjustments of saturation, lightness, and hue.
  4. Each image area, whether it is a color edge area, black edge area, dot area, or a continuous gradation area, is discriminated to optimize edge emphasis and smoothing just right for the image
  5. The color component data (R,G,B) are converted to the Y, M, C, and K density data. Also, the masking processing, which compensates for the deviation in the spectral reflection characteristics of the toner, and UCR/BP processing are performed on the image data.
  6. Other types of processing performed are the improved reproduction of black text, edge emphasis, smoothing and color balance.
  7. In photo mode and PC print, each image data of Y, M, C, K is compressed to reduce the consumption of data capacity.
  8. Binary data gets gamma correction at this time. Makes the necessary corrections so that the printed gradations have linear characteristics, since the image density of the input image data is not directly proportional to that of the printed image because of the changing developing and PC drum characteristics.
  9. In photo mode and PC print, the image is processed as multi-valued data (8-bit data). In any mode other than photo, the error diffusion method is employed to process the image as binary (1-bit) data.
  10. Temporarily stores the BTC-compressed image data and error diffusion data.
  11. The stored image data is compressed in the JBIG (joint bi-level image experts group) format.
  12. Stores the compressed image data.
  13. The image data read from the file memory is uncompressed through a method in a reverse way of JBIG compression. At this time, image rotating or sorting processing is conducted.
  14. Image data of the file memory is developed to the frame memory and output delay control for the interval of PC drums, Y, M, C, K is conducted.
  15. Stores the Y, M, C, and K image data.
  16. Temporarily stores the image data output from the frame memory.
  17. Expands the image data using the method opposite to that used in BTC compression.
  18. Correct the shear in printing start position in the main scanning direction, which occurs when each PH unit of Y, M, C, K is exposed on the PC drum.
  19. Edge of letter and lineal drawing gets area discrimination and FEET processing is conducted according to the discrimination result.
  20. When FEET processing is conducted, interpolation is done so that no influence is given to continuous gradation portion.
  21. Multi-valued data gets gamma correction at this time. makes the necessary corrections so that the printed gradations have linear characteristics, since the image density of the input image data is not directly proportional to that of the printed image because of the changing developing and PC drum characteristics.

22. Creates the density distribution of a predetermined pattern to enable outstanding gradation reproduction.
23. Adjust the processing speed in the board (main scanning) to conform to the input processing speed.
24. The laser is emitted according to the laser intensity information.

24. Other control

24.1 Fan control

24.1.1 Construction


Scanner cooling fan motor (M202)
Fusing cooling fan motor/1 (M13)
Fusing cooling fan motor/2 (M11)
Cooling fan motor/2 (M22)
Cooling fan motor/1 (M12)
Power supply cooling fan motor/2 (M9)
Ozone ventilation fan motor (M14)
Suction fan motor (M10)
4038T2C032DC
Power supply cooling fan motor/1 (M8)

24.1.2 Operation

A. Function

Motor name	Control conditions
Power supply cooling fan motor/1 (M8)	It exhausts the accumulated heat inside the unit in order to prevent temperature from increasing at DC power supply part and the controller part.
Power supply cooling fan motor/2 (M9)	• It exhausts the accumulated heat inside the DC power supply box in order to avoid temperature increase at DC power supply part. • A dust filter/cooling fan are mounted inside the ventilation duct in order to remove dust power supply cooling fan motor/2 sucked with the air inside the unit.
Ozone ventilation fan motor (M14)	• A white belt may occur on the image because of the lower sensitivity of the PC drum due to ozone accumulated around the PC drum charge corona. In order to avoid this trouble, ozone filter removes the ozone inside the PC drum charge corona to keep the sensitivity of the PC drum. • Ozone accumulated around PC drum charge corona will be absorbed by Ozone filter and be removed.
Fusing cooling fan motor/1 (M13)	• Odor accumulated between TC part and fusing part is absorbed by the odor filter to be removed. • In order to keep the temperature between TC part and fusing part as well as motor part, heat accumulated inside the unit will be exhausted.
Fusing cooling fan motor/2 (M11)	When the paper with toner heated at fusing part exit while still at high temperature, toner may be transferred to other paper on the exit tray. In order to avoid this, air is applied to cool the toner and paper.
Suction fan motor (M10)	• Paper will be sucked between 2nd transfer part and fusing part, so it will have a stable behavior and go smoothly into the fusing roller. The air inside will be exhausted outside the unit. • A dust filter/vertical transfer are mounted inside the ventilation duct in order to remove dust the suction fan sucked with the air inside the unit.
cooling fan motor/1 (M12)	Heat accumulated inside the unit will be discharged in order to avoid temperature increase, etc., inside the transfer part (transfer belt, transfer clutch.)
Cooling fan motor/2 (M22)	Heat accumulated inside the unit will be discharged in order to avoid temperature increase, etc., of the upper part inside the board box as well as around the color PC motor.
Scanner cooling fan motor (M202)	Heat accumulated inside the IR part will be discharged in order to avoid temperature increase, etc., at the scanner part.

B. Fan control

Motor name	Control	Control conditions (outline)
Power supply cooling fan motor/1 (M8)	Stop	• Plug-in/sub-power switch OFF • When re-writing flash-ROM • In low-power or sleep
	Half speed	• In standby • At paper-jam, in trouble, or when the door is open • All drive systems are OFF due to the cause except paper jam, trouble, or door being open
	Full speed	• At warm-up, initial operation, image stabilization, function*1, or printing
Power supply cooling fan motor/2 (M9)	Stop	• Plug-in/sub-power switch OFF • When re-writing flash-ROM • In low-power or sleep • At paper-jam, in trouble, or when the door is open • All drive systems are OFF due to the cause except paper jam, trouble, or door being open
	Half speed	• In standby
	Full speed	• At warm-up, initial operation, image stabilization, function*1, or printing
Ozone ventilation fan motor (M14)	Stop	• Plug-in/sub-power switch OFF • In standby, low power, or sleep • When re-writing flash-ROM • At paper-jam, in trouble, or when the door is open • All drive systems are OFF due to the cause except paper jam, trouble, or door being open
	Half speed	-
	Full speed	• At warm-up, initial operation, image stabilization, function*1, or printing
Fusing cooling fan motor/1 (M13)	Stop	• At plug-in/sub-power switch OFF • At warm-up, initial operation, image stabilization, function*1, or sleep • When re-writing flash-ROM • At paper-jam, in trouble, or when the door is open • All drive systems are OFF due to the cause except paper jam, trouble, or door being open
	Half speed	• When in low power, or in standby
	Full speed	• When printing
Fusing cooling fan motor/2 (M11)	Stop	• At plug-in/sub-power switch OFF • At warm-up, low power, or sleep • At initial operation, image stabilization, or function*1. • When re-writing flash-ROM • At paper-jam, in trouble, or when the door is open • All drive systems are OFF due to the cause except paper jam, trouble, or door being open
	Half speed	• In standby
	Full speed *2	• When printing

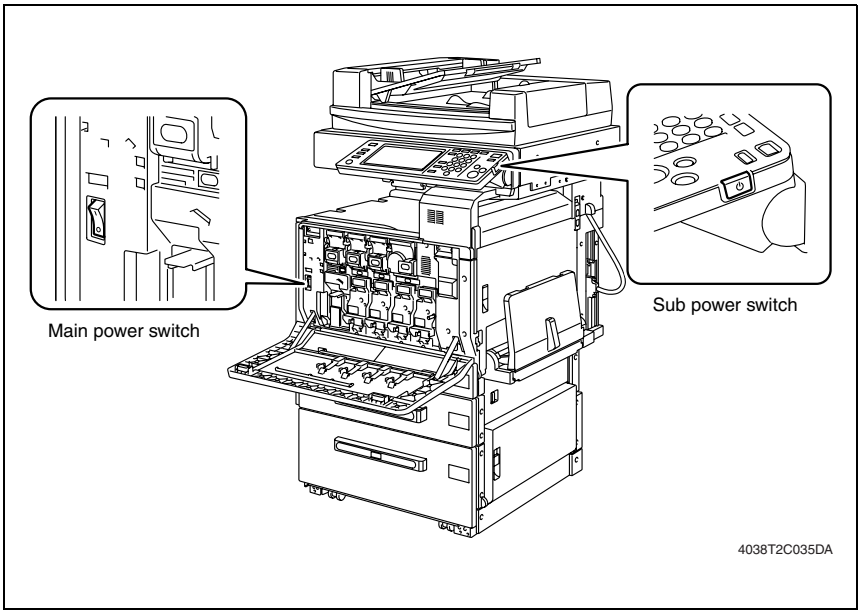
Motor name	Control	Control conditions (outline)
Suction fan motor (M10)	Stop	• At plug-in/sub-power switch OFF • At warm-up, low power, or sleep • When re-writing flash-ROM
	Half speed	• At initial operation, image stabilization, and function[*1] • In standby • At paper-jam, in trouble, or when the door is open. • All drive systems are OFF due to the cause except paper jam, trouble, or door being open.
	Full speed	• When printing
Cooling fan motor/1 (M12)	Stop	• At plug-in/sub-power switch OFF • When re-writing flash-ROM • When in low power or sleep
	Half speed	• In standby • At paper-jam, in trouble, or when the door is open. • All drive systems are OFF due to the cause except paper jam, trouble, or door being open.
	Full speed	• At warm-up or printing • At initial operation, image stabilization, or function[*1]
Cooling fan motor/2 (M22)	Stop	• Plug-in/sub-power switch OFF • At warm-up, in standby, lower power, or sleep • When re-writing flash-ROM • At paper-jam, in trouble, or when the door is open. • All drive systems are OFF due to the cause except paper jam, trouble, or door being open.
	Half speed	-
	Full speed	• At initial operation, image stabilization, function[*1], or printing
Scanner cooling fan motor (M202)	Full speed	• Turns at full speed while the exposure lamp (FL201) remains ON

- [*1]: Main motor (M1) is ON, and not printing or warming-up.
- [*2]: Rotates at half speed until the exit sensor turns ON during printing.
- Half speed control: When switching from stop to half speed control, the fan will rotate at full speed and then will rotate at half speed.

24.2 Parts operated when the power switch and sub power switch are turned ON

24.2.1 Parts operated when the power switch and sub power switch are turned ON

- When the sub power switch is turned ON, the MFP control board detects it and sends a control signal to the DC power supply trough the mechanical control board.
- The DC power supply then supplies 5V DC, 12V DC, 15V DC, and 24V DC to all PWBs and options. It also turns ON the relays in the PWBs, preparing AC power ready to be supplied to each heater lamp.

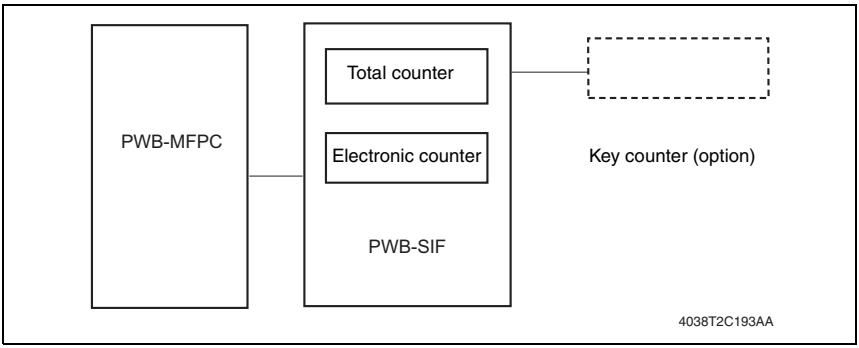


NOTE

- **To turn OFF the power switch, turn OFF the sub power switch. Check that the start key turns from green to orange and then goes out. (check that power supply to the HDD is shut down. Turning OFF the power switch while the HDD is running could result in a defective HDD.) Turn OFF the power switch after the start key has gone out.**
- **To turn OFF and ON the power switch, first turn OFF the power switch and wait for 10 sec. or more before turning it ON again. If a setting value or values in the tech. rep. mode are changed, it takes 10 sec. or more to incorporate the setting changes properly in the machine.**
- **Power switch OFF/ON procedure**
  1. Turn OFF the sub power switch.
  2. Turn OFF the power switch.
  3. Wait for 10 sec.
  4. Turn ON the power switch.
  5. Turn ON the sub power switch.

24.3 Counter control

24.3.1 Construction



Name	Function/system
Total counter	• Displays the cumulative number of copies and prints of all jobs. • A mechanical counter driven by an electric signal • Counts one when an exit signal is applied to it
Electronic counter	• Number of total copies/prints in copy/print/scan/fax mode will be displayed on the screen as described below. • Black, full color, mono color, and 2 color • Total counter, large size counter, color total (copy + printer), print counter, scan counter, fax TX counter, fax RX counter, no. of originals counter, no. of prints counter, total duplex counter • Counts one when an exit signal is applied to it
Key counter (option)	• When charging prints by using the key counter, copies cannot be made with out the key counter. However PC prints and fax TX/RX service are available without the key counter. • Displays the cumulative number of copies while the key counter is being mounted. • A mechanical counter driven by an electric signal • Counts one when a paper take-up start signal or image forming start signal, whichever occurs earlier, is applied to it

△2 **NOTE**

- **The counting modes can be selected at [billing setting] of service mode. For details, see [field service/adjustment/setting/billing setting].**

KONICA MINOLTA

SERVICE MANUAL

THEORY OF OPERATION

DF-601

2005.07
KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

Revision history

After publication of this service manual, the parts and mechanism may be subject to change for improvement of their performance.
Therefore, the descriptions given in this service manual may not coincide with the actual machine.

When any change has been made to the descriptions in the service manual, a revised version will be issued with a revision mark added as required.

Revision mark:

- To indicate clearly a section revised, show to the left of the revised section.
  A number within represents the number of times the revision has been made.

- To indicate clearly a section revised, show in the lower outside section of the corresponding page.
  A number within represents the number of times the revision has been made.

NOTE

Revision marks shown in a page are restricted only to the latest ones with the old ones deleted.

- When a page revised in Ver. 2.0 has been changed in Ver. 3.0:
  The revision marks for Ver. 3.0 only are shown with those for Ver. 2.0 deleted.
- When a page revised in Ver. 2.0 has not been changed in Ver. 3.0:
  The revision marks for Ver. 2.0 are left as they are.

2005/07	1.0	—	Issue of the first edition
Date	Service manual Ver.	Revision mark	Descriptions of revision

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Outline

1. Product specifications

A. Type

Name	Duplexing Document Feeder	
Type	Paper Take-Up	Paper Take-Up from top of stack
	Transport	Endless Belt Transport Mode
	Turnover	Loop Turnover Mode
	Paper Exit	U-turn Turnover + Switchback U-Turn Turnover Mode (only in 1-Sided Mode)
Installation	Screw cramp to the main body	
Document Alignment	Center	
Document Loading	Face up	

B. Functions

Modes	Standard Mode	1-Sided Mode / 2-Sided Mode
	Thick Paper Mode	1-Sided Mode
	Mixed Original Detection Mode	1-Sided Mode / 2-Sided Mode

C. Paper type

Type of Document	Standard Mode Plain Paper	1-Sided Mode 35 to 128 g/m^2 (9-1/4 to 34 lb)
		2-Sided Mode 50 to 110 g/m^2 (13-1/4 to 29-1/4 lb)
	Thick Paper Mode Plain Paper	1-Sided Mode 129 to 210 g/m^2 (34-1/4 to 55-3/4 lb)
	Mixed Original Detection Mode Plain Paper	1-Sided / 2-Sided Mode 50 to 110 g/m^2 (13-1/4 to 29-1/4 lb)
Detectable Document Size*1	Metric area B6S to A3 Inch area 5-1/2 × 8-1/2S / 5-1/2 × 8-1/2 to 11 × 17	
Capacity	Standard Mode / Mixed Original Detection Mode	Document Feed Table: 100 sheets (80 g/m^2, 21-1/4 lb)
		Original Exit Tray: 100 sheets (80 g/m^2, 21-1/4 lb)
	Thick Paper Mode	Document Feed Table: 38 sheets (210 g/m^2, 55-3/4 lb)
		Original Exit Tray: 38 sheets (210 g/m^2, 55-3/4 lb)

*1: For the Combined Original Detection Mode, Refer to the Mixed Original Detection Enabled Size Combination Table.

D. Machine specifications

Power Requirements	DC 24 V (supplied from the main body)
	DC 5 V (generated within the DF-601)
Max. Power Consumption	60 W or less
Dimensions	586 mm (W) × 519 mm (D) × 135 mm (H) 23 inch (W) × 20-1/2 inch (D) × 5-1/4 inch (H)
Weight	14.2 kg (31.25 lb)

E. Operating environment

Conforms to the operating environment of the main body.

NOTE

- **These specifications are subject to change without notice.**

2. Mixed original feed

2.1 Mixed original feed chart

For Metric

	Max. Original Size	297 mm		257 mm		210 mm		182 mm	148 mm
Mixed Original Size		A3	A4	B4	B5	A4S	A5	B5S	A5S
297 mm	A3	OK	OK	-	-	-	-	-	-
	A4	OK	OK	-	-	-	-	-	-
257 mm	B4	OK	OK	OK	OK	-	-	-	-
	B5	OK	OK	OK	OK	-	-	-	-
210 mm	A4S	OK	OK	OK	OK	OK	OK	-	-
	A5	NG	NG	OK	OK	OK	OK	-	-
182 mm	B5S	NG	NG	OK	OK	OK	OK	OK	-
148 mm	A5S	NG	NG	NG	NG	NG	NG	OK	OK

For Inch

	Max. Original Size	11		8-1/2			5-1/2
Mixed Original Size		11 × 17	8-1/2 × 11	8-1/2 × 14	8-1/2 × 11S	5-1/2 × 8-1/2	5-1/2 × 8-1/2S
11	11 × 17	OK	OK	-	-	-	-
	8-1/2 × 11	OK	OK	-	-	-	-
8-1/2	8-1/2 × 14	OK	OK	OK	OK	OK	-
	8-1/2 × 11S	OK	OK	OK	OK	OK	-
	5-1/2 × 8-1/2	NG	NG	OK	OK	OK	-
5-1/2	5-1/2 × 8-1/2S	NG	NG	NG	NG	NG	OK

OK	Mixed Original Feed available (Tilted with in 1.5% or less)
NG	NO. Mixed Original Feed
-	Can not Set Original

2.2 Paper feed prohibited originals

- If fed, trouble occurrence will be highly possible.

Type of Original	Possible Trouble
Sheets stapled or clipped together	Take-up failure, damaged sheet, defective drive mechanism due to jammed staples or clips
Sheets glued together	Take-up failure, damaged sheet
Sheets of 211 g/m^2 (56-1/4 lb) or more	Take-up failure
Sheets of 110 g/m^2 (29-1/4 lb) or more in 2-Sided Mode	Take-up failure
Sheets folded, torn or wrinkled	Take-up failure, damaged sheet
Sheets severely curled	Sheets misfed due to being dog-eared or fed in askew
OHP Film (Transparency Film)	Take-up failure
Label Paper	Take-up failure
Offset Master Paper	Take-up failure
Sheets clipped or notched	Damaged sheet
Sheets patched	Patched part folded or torn sheet

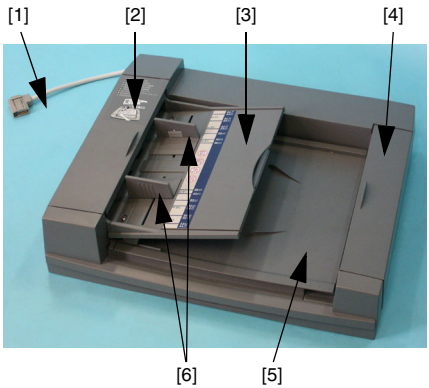
2.3 Paper feed not guaranteed originals

- If fed, paper feed will be possible to some extent but trouble occurrence will be possible.

Type of Original	Possible Trouble
Sheets lightly curled (Curled amount: 10 - 15 mm)	Dog-eared, exit failure
Heat Sensitive Paper	Edge folded, exit failure, transport failure
Ink jet Paper	Take-up failure, transport failure
Sheets with smooth surface (Coated Paper)	Take-up failure, transport failure
Intermediate paper	Take-up failure, transport failure
Paper immediately after paper exit from the main body	Take-up failure, transport failure
Paper with many punched holes (e.g., loose leaf) limited to vertical feeding	Multi-page feed due to flashes from holes
Sheets with 2 to 4 holes	Transport failure
Sheets two-folded or z-folded (A3 or 11 × 17)	Transport failure, image deformation
Sheets with rough surface (e.g., letterhead)	Take-up failure
Sheets penciled	Contamination
Sheets folded	Image deformation, multi-page feed, take-up failure
Sheets other than detectable-size sheets	Image deficit

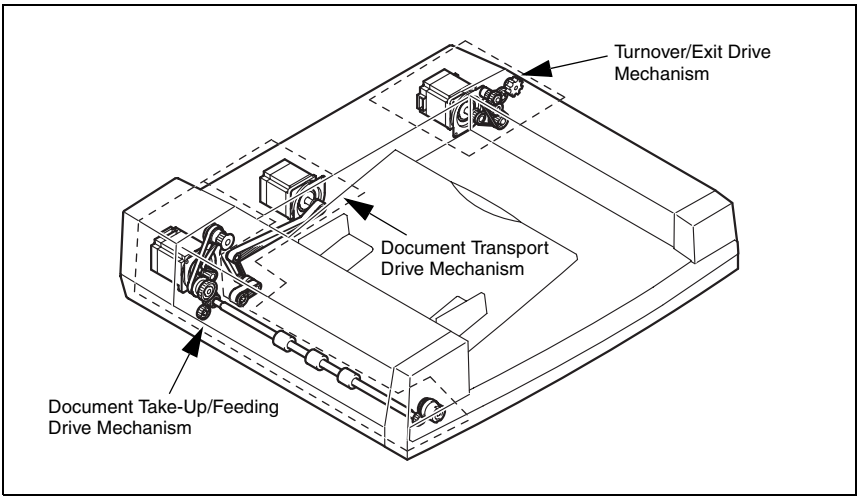
Composition/Operation

3. Overall composition



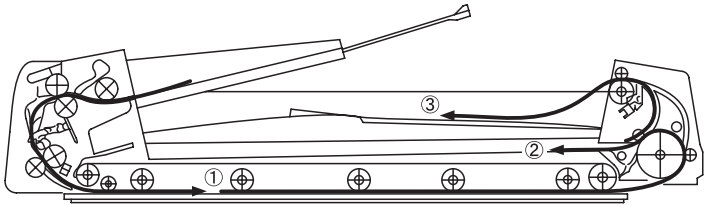
[1] Hookup Cord
[2] Take-Up Cover
[3] Document Feed Tray
[4] Exit Cover
[5] Turnover Cover
[6] Document Guide
[7] Transport Belt
[8] Magnet

4. Drive system

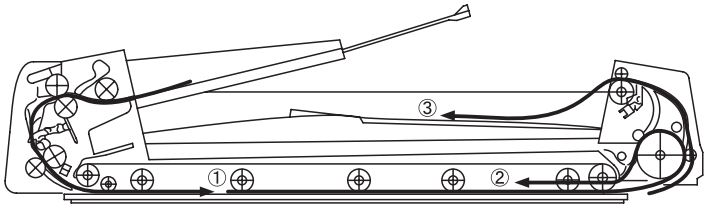


5. Paper path

Single-sided Document Mode



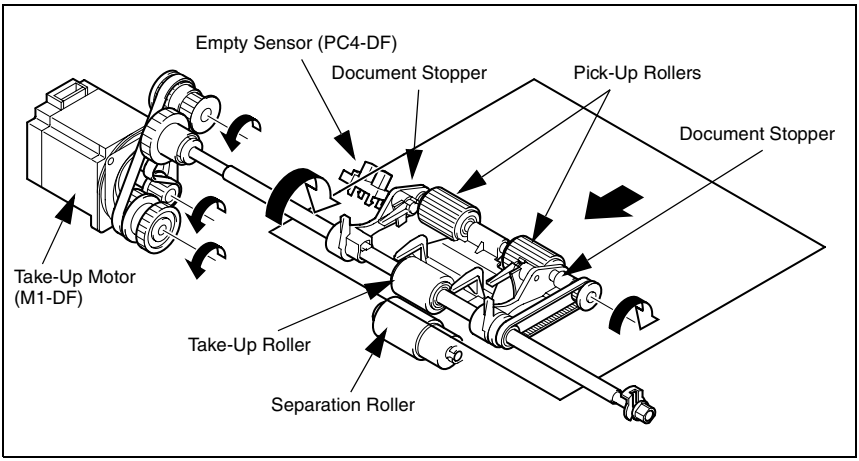
Double-sided Document Mode



6. Mechanical operations

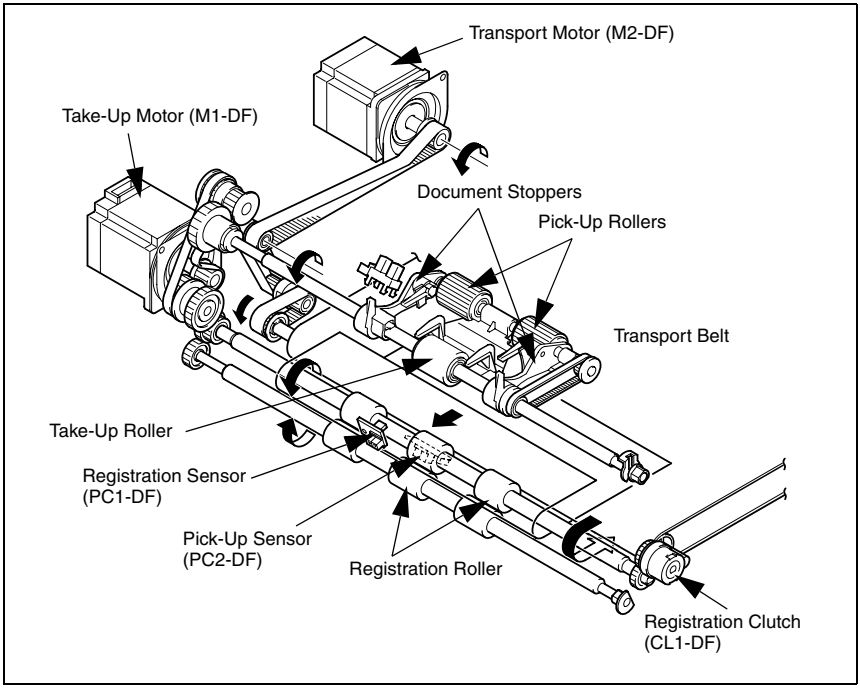
6.1 Document pick-up mechanism

- The Document Pick-Up Section consists of the Document Stoppers, Pick-Up Rollers, Take-Up Roller and Separation Roller, and this section is driven by the Take-Up Motor.
- The Pick-Up Rollers stay at their upper position during the standby state and are lowered when taking-up an original.
- The Document Stoppers stay at their lower position during the standby state and retract to their upper position when taking-up an original. The originals are separated and only one sheet is taken-up by the Take-Up and Separation Rollers.
- A torque limiter is installed to the Separation Roller to provide the separating operation.



6.2 Document take-up/transport mechanism

- The Pick-Up and Take-Up Rollers are rotated by the Take-Up Motor and an original is taken-up and transported to the Registration Roller.
- Then, the original is transported onto the Original Glass by the Registration Roller driven by the Take-Up Motor, and the Transport Belt driven by the Transport Motor.



A. Document take-up operation flow

Registration Clutch: ON
↓
Take-Up Motor: Forward Rotation
↓
Pick-Up Rollers go down and rotated via timing belt & gears
↓
At the same time, Document Stoppers go up
↓
An original is taken-up and transported.
↓
A loop is formed to correct the skew feeding after Registration Sensor is activated.
↓
Take-Up Motor: OFF
↓
Registration Clutch: OFF (release of Registration Roller)
Take-Up Motor: Backward Rotation
↓
The original is transported.
↓
Pick-Up Sensor: ON
↓
Start of the original size detection in the feeding direction
↓
Take-Up Motor: OFF

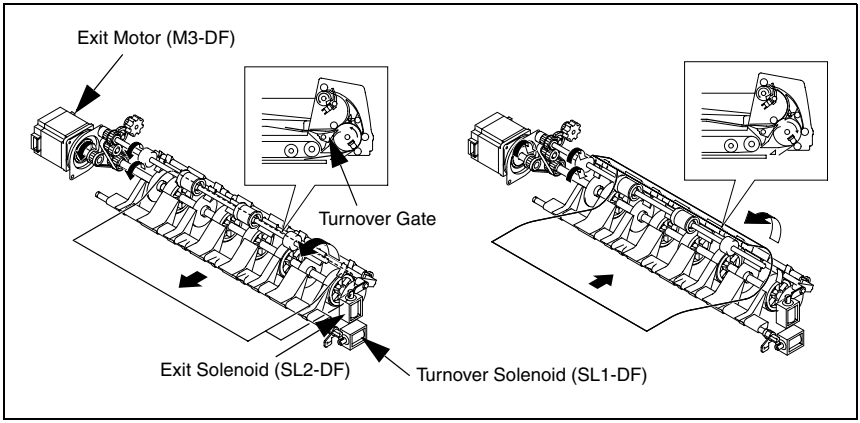
B. Document transport operation flow

Transport Motor: Forward Rotation
↓
Take-Up Motor: Backward Rotation
↓
The original is transported onto the Original Glass.
↓
The original size is determined when Registration Sensor: OFF
↓
Take-Up Motor: OFF when Pick-Up Sensor: OFF
↓
Transport Motor: OFF when the original is reached to its reference position
↓
Registration Clutch: ON

6.3 Document exit mechanism

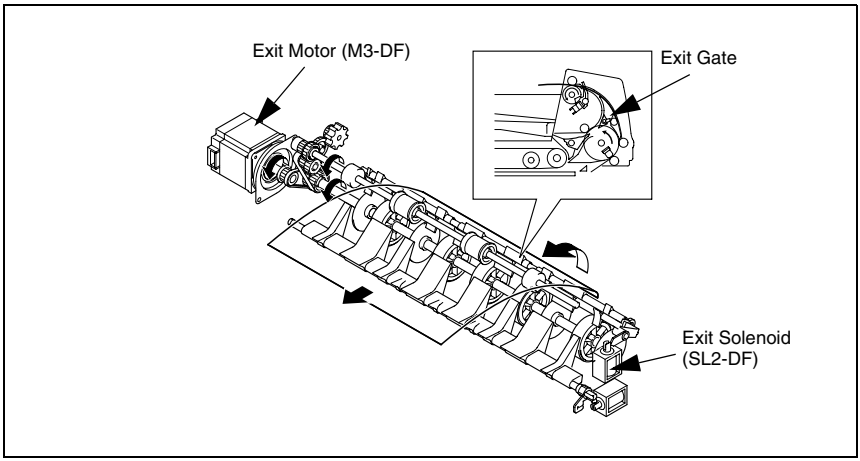
6.3.1 Single-sided document mode

- The original transported by the Transport Belt is sent to the switchback section and then ejected onto the Exit Tray with its face-down in order to keep the original pages in proper order.



6.3.2 Double-sided document mode

- In the Double-Sided Mode, an original which has had its 2nd side scanned is ejected onto the Exit Tray without the turn-over motion. (Face-down Ejection)



6.3.3 Exit operation flow

A. Document exit motion in single-sided mode

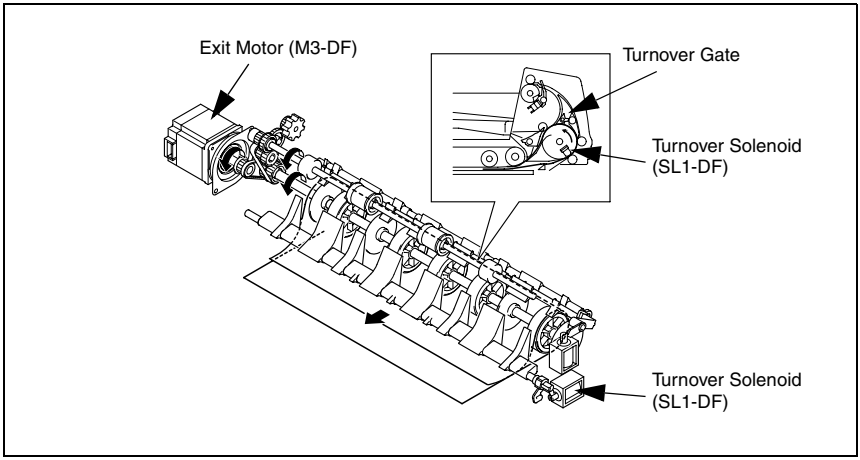
Exit Motor: Forward Rotation
↓
Transport Motor: Forward Rotation
↓
The original is transported to the switchback section.
↓
Transport Motor: OFF after the original leaves from the Transport Belt
↓
Exit Motor: OFF after passing a specified time from Turnover Sensor: OFF
↓
Exit Motor: Backward Rotation
↓
The original is transported to the Exit Roller.
↓
The rotation speed of the Exit Motor is reduced before the Exit Sensor goes OFF.
↓
The original is ejected on the Exit Tray with lower speed.
↓
Exit Motor: OFF

B. Document exit motion in double-sided mode

Exit Solenoid: ON
↓
Exit Motor: Forward Rotation
↓
Transport Motor: Forward Rotation
↓
The original is transported to the exit section.
↓
Transport Motor: OFF after the original leaves from the Transport Belt
↓
Turnover Sensor: OFF
↓
Exit Solenoid: OFF after passing a specified time
↓
The rotation speed of the Exit Motor is reduced before the Exit Sensor goes OFF.
↓
The original is ejected on the Exit Tray with lower speed.
↓
Exit Motor: OFF

6.4 Turnover mechanism (two-sided mode)

- In the Double-Sided Mode, an original which has its 1st side scanned is turned-over and then transported to the scan position again for the 2nd side scanning.



A. Turnover operation flow

Exit Motor: Forward Rotation
↓
Transport Motor: Forward Rotation
↓
Turnover Solenoid: ON (Switching of paper path in turnover section)
↓
Turnover Sensor: ON
↓
Transport Motor: OFF
↓
Exit Motor: OFF
↓
Transport Motor: Backward Rotation
↓
Exit Motor: Forward Rotation
↓
Starts the original transportation to its scan position
↓
Turnover Sensor: OFF
↓
Turnover Solenoid: OFF
↓
Exit Motor: OFF
↓
Transport Motor: OFF

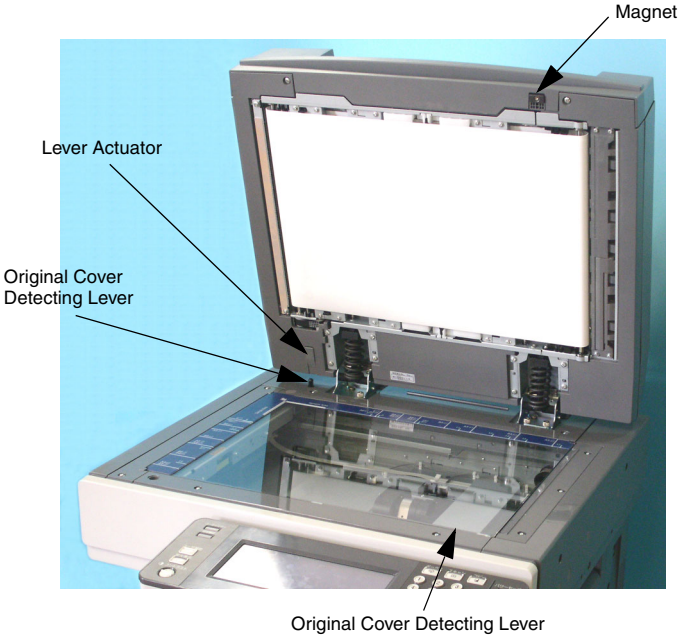
6.5 Raised/lowered position detecting mechanism

6.5.1 Document size detection

- The 20 degree Open Detection Mechanism enables the main body to detect the document size when the RADF is used as the Original Cover of the main body, there is the Lever Actuator provided in the RADF body that blocks or unblocks a sensor to initiate a reconfirmation of the original size as read by the original size detection sensors.

6.5.2 Raised/lowered position detection

- The Raised/Lowered Position Detection Mechanism uses a magnet installed in the RADF body to allow the main body to know that the RADF is raised or lowered. This magnet actuates the Size Reset Switch on the main body to perform this operation.



KONICA MINOLTA

SERVICE MANUAL THEORY OF OPERATION

PC-103/PC-203

2005.07

KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

Revision history

After publication of this service manual, the parts and mechanism may be subject to change for improvement of their performance.
Therefore, the descriptions given in this service manual may not coincide with the actual machine.

When any change has been made to the descriptions in the service manual, a revised version will be issued with a revision mark added as required.

Revision mark:

- To indicate clearly a section revised, show to the left of the revised section.
  A number within represents the number of times the revision has been made.

- To indicate clearly a section revised, show in the lower outside section of the corresponding page.
  A number within represents the number of times the revision has been made.

NOTE

Revision marks shown in a page are restricted only to the latest ones with the old ones deleted.

- When a page revised in Ver. 2.0 has been changed in Ver. 3.0:
  The revision marks for Ver. 3.0 only are shown with those for Ver. 2.0 deleted.
- When a page revised in Ver. 2.0 has not been changed in Ver. 3.0:
  The revision marks for Ver. 2.0 are left as they are.

2005/07	1.0	—	Issue of the first edition
Date	Service manual Ver.	Revision mark	Descriptions of revision

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PC-103/PC-203

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Outline

1. Product specifications

A. Type

Name	2 way Paper Take-Up Cabinet
Type	Front loading type 2 way paper take-up device
Installation	Desk type
Document Alignment	Center

B. Paper type

Type	Plain paper	60 to 90 g/m^2 (16 to 24 lb)
	Recycled paper	60 to 90 g/m^2 (16 to 24 lb)
Size	A5S to A3, 5.5 × 8.5S to 11 × 17	
Capacity	3rd Drawer	500 sheets (80 g/m^2, 21.25 lb)
	4th Drawer	500 sheets (80 g/m^2, 21.25 lb)

C. Machine specifications

Power Requirements	DC 24 V ± 10 % (supplied from the main body)
	DC 5 V ± 5 %
Max. Power Consumption	75 W or less
Dimensions	570 mm (W) × 548 mm (D) × 263 mm (H) 22.5 inch (W) × 21.5 inch (D) × 10.25 inch (H)
Weight	PC-103: 22.0 kg (48.5 lb) PC-203: 26.0 kg (57.25 lb)

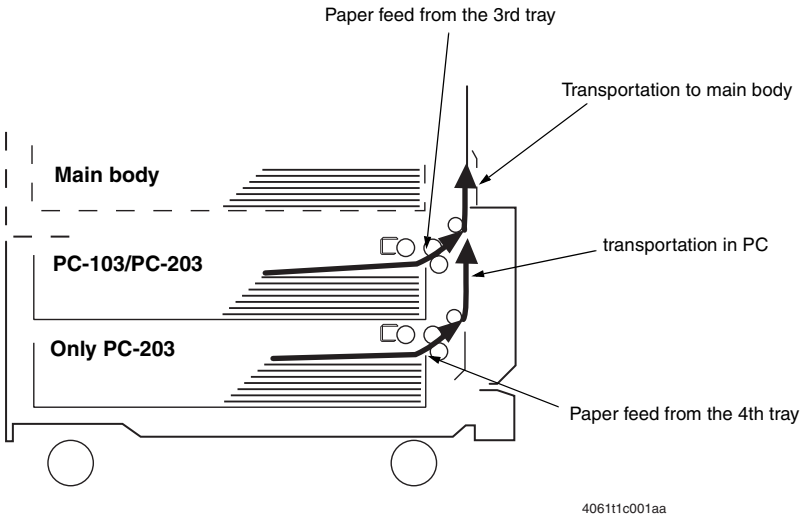
D. Operating environment

Conforms to the operating environment of the main body.

NOTE

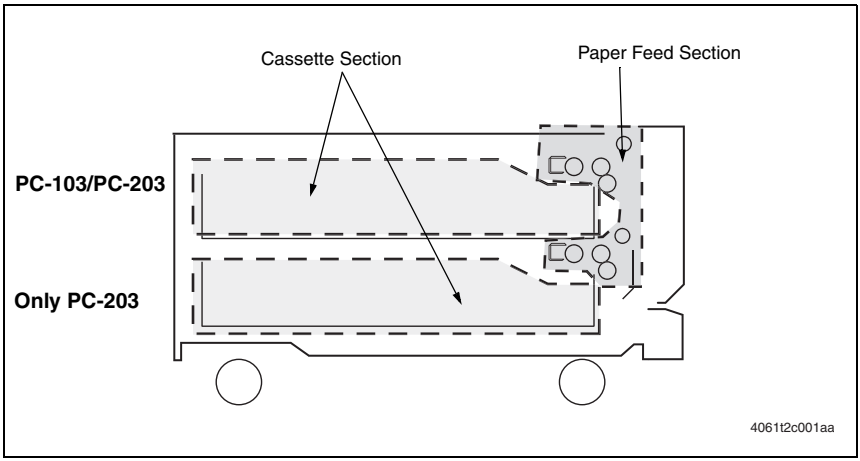
- **These specifications are subject to change without notice.**

2. Paper Feed path



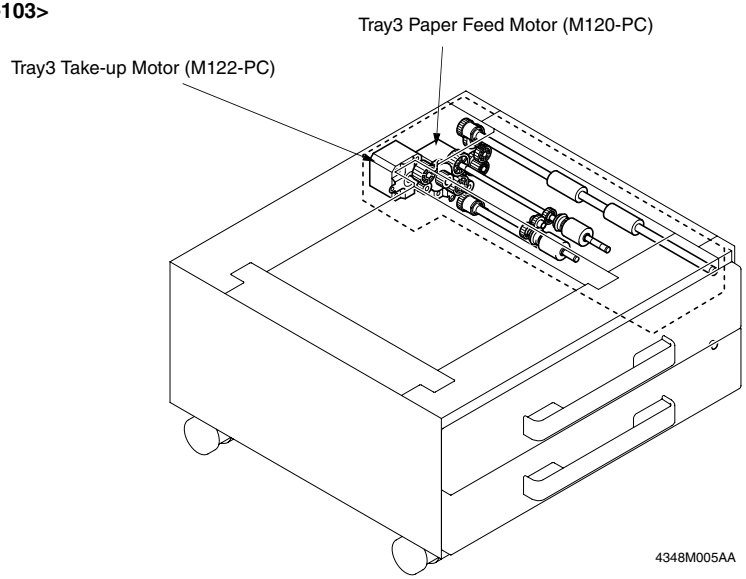
Composition/Operation

3. Composition



4. Drive system

<PC-103>



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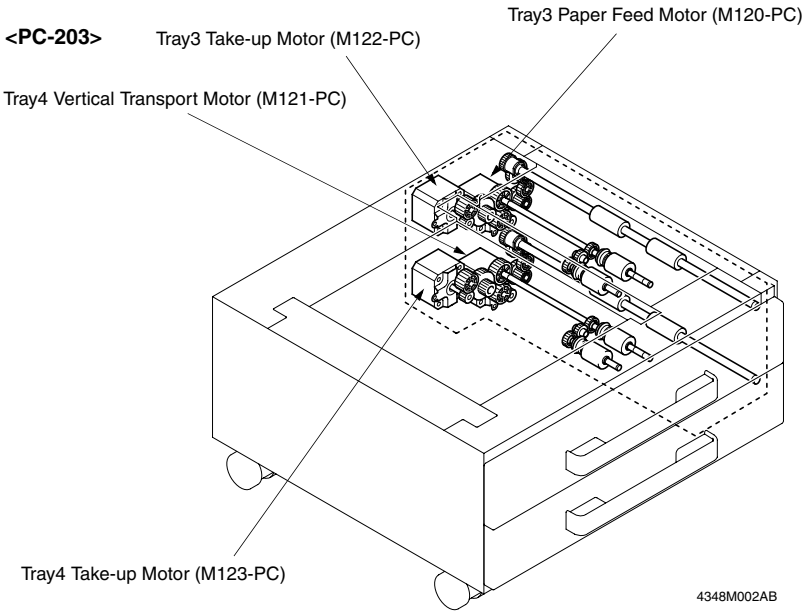
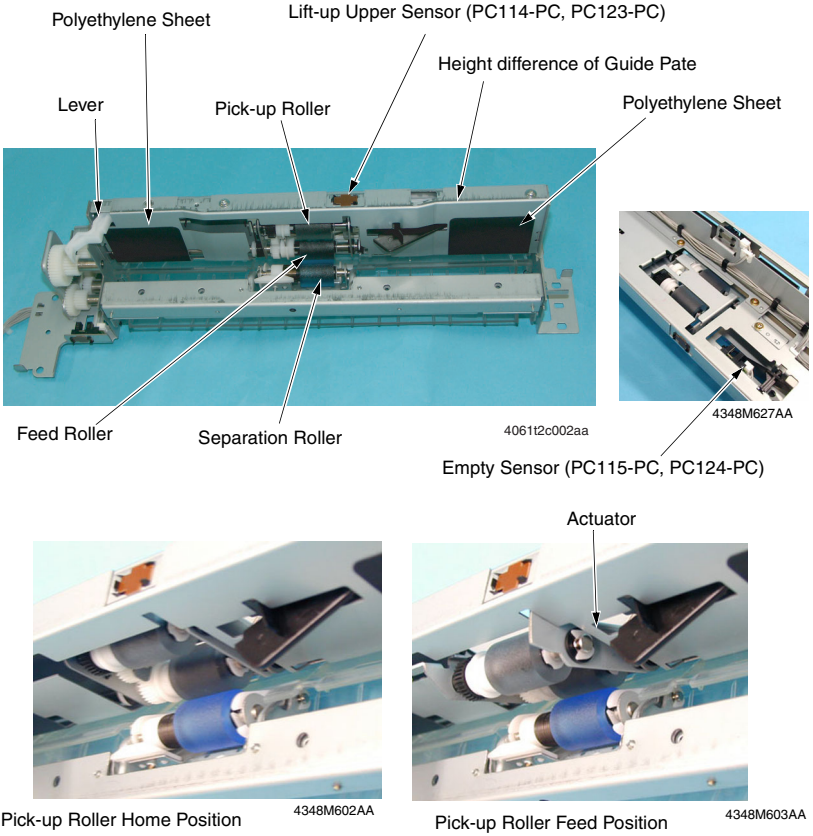


5. Operations

5.1 Paper Feed Section

5.1.1 Vertical transport drive mechanism

- The Paper Feed Motor drives the Pick-up Roller and Paper Take-up Roller to take up and feed a sheet of paper into the main body.
- Then, the Transport Roller Motor transports the paper through the vertical transport section.
- The Pick-up Roller takes up sheets of paper and the Paper Take-up and Separation Rollers ensure that only one sheet of paper is separated and fed into the main body.
- When the drawer is slid in, the lever is pushed to lower the Pick-up Roller.
- The Lift-up Upper Sensor then detects the upper limit position when the paper lifting plate is raised.
- The Empty Sensor detects when paper in the drawer runs out.
- The polyethylene sheet and Height difference of Guide Plate are reduces resistance between a curled sheet of paper and guide, thereby preventing skewed feeding.

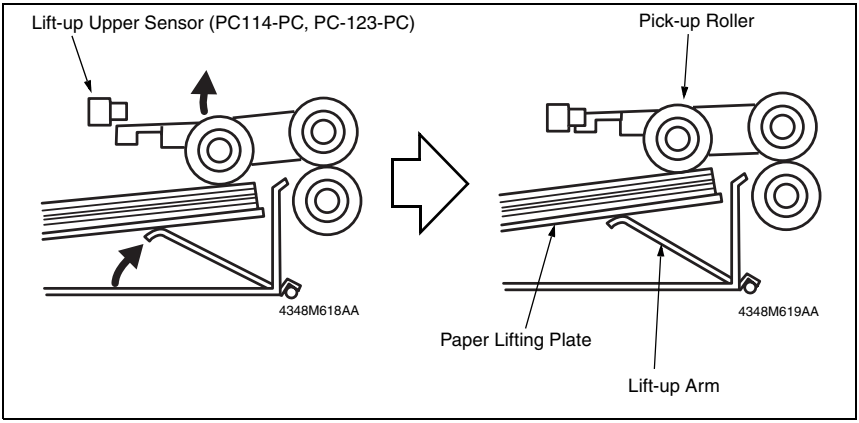


5.1.2 Paper lifting motion

- When the drawer is slid into the main body and the Device Detection Sensor is activated, the Lift-up Motor starts rotating to raise the Paper Lifting Plate.
- The paper stack of the drawer pushes up the Pick-up Roller. When the upper limit position is detected through the action of the actuator, it stops raising the paper lifting plate.
- As paper is consumed during the print cycle and the Pick-up Roller is lowered, the Lift-up Motor is energized until the Lift-up Upper Sensor is blocked again.

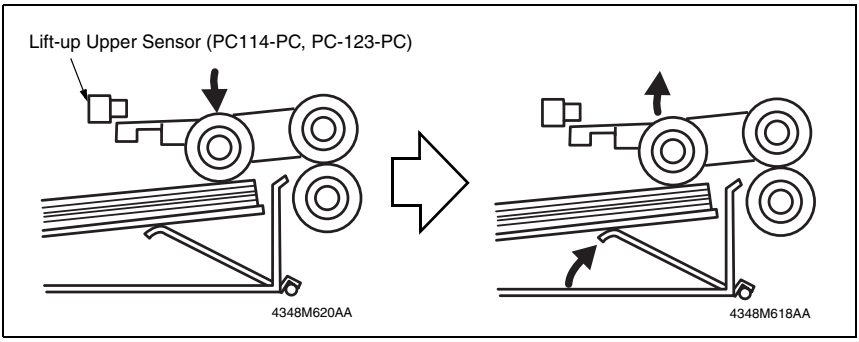
A. When the drawer is slid in

1. The paper lifting plate goes up and the top surface of the paper stack pushes up the roller.
2. The lifting motion stops as soon as the sensor detects the upper limit position.



B. During a print cycle

1. As the paper is consumed, the sensor is unblocked.
2. The paper lifting plate goes up.

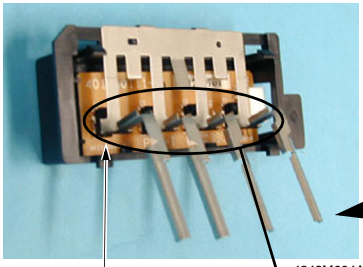


5.2 Cassette Section

5.2.1 Paper size detection

- When the Trailing Edge Stop of the drawer is moved, the circular plate located on the bottom of the drawer turns, allowing the four FD Paper Size Sensors on the Paper Size Board.
- Moving the Edge Guide activates or deactivates the two CD Paper Size Sensors through the cutout in the lever.
- The combination of the four FD Paper Size Sensors and two CD Paper Size Sensors that are either activated or deactivated determines the size of the paper loaded in the drawer.
- The Tray Device Detection Sensor detects that the drawer is slid into position as it is slid in.

Length Detection



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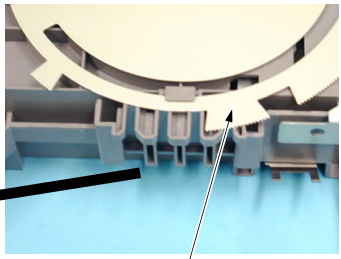

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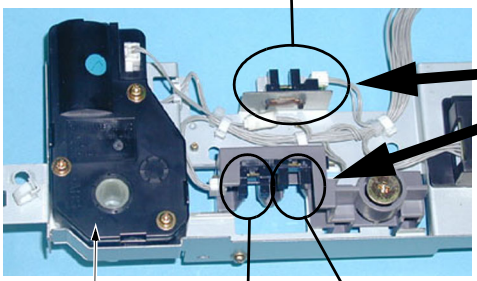
FD Paper Size Sensors

Circular Plate

Paper Size Board (PWB-I/(3) PC, PWB-I/(4) PC)

Width Detection

Device Detection Sensor (PC122-PC, PC-121-PC)



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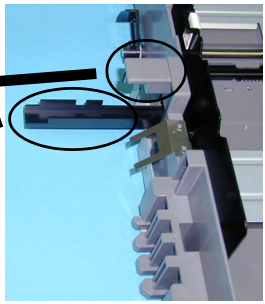

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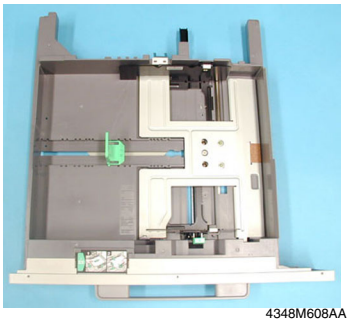
CD Paper Size Sensor/1 (PC118-PC, PC127-PC)

CD Paper Size Sensor/2 (PC119-PC, PC128-PC)

Lift-up Motor (M124-PC, M125-PC)

5.2.2 Paper level indicator mechanism

- All drawers now use the universal paper size tray for greater functionality.
- There is a window in the front cover of the drawer that serves as the Paper Level Indicator showing the amount of paper that is still available for use.
- A red lever is attached to the paper lifting plate of the drawer and as the paper lifting plate raises, the red lever becomes visible in the window.
- The more the red lever is visible, the lesser the amount of paper will be available for use.



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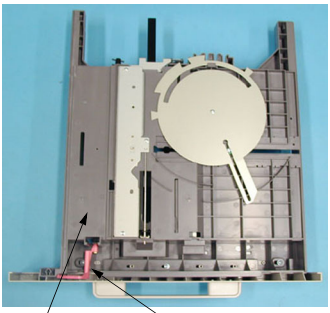

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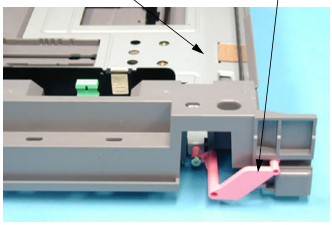
Cassette bottom plate

Lever

paper lifting plate

4348M610AA

Paper Level Indicator on the front cover of the drawer



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Operated by the paper lifting plate of the drawer

KONICA MINOLTA

SERVICE MANUAL

THEORY OF OPERATION

PC-403

2005.07

KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

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2005/07	1.0	—	Issue of the first edition
Date	Service manual Ver.	Revision mark	Descriptions of revision

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5.2.2 Shift Gate drive mechanism 7
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Outline

1. Product specification

A. Type

Name	Large Capacity Cabinet
Type	Front loading type LCC
Installation	Desk type
Document Alignment	Center

B. Paper type

Type	Plain paper	60 to 90 g/m^2 (16 to 24 lb)
	Recycled paper	60 to 90 g/m^2 (16 to 24 lb)
Size	A4, 8.5 × 11	
Capacity	2500 sheets (80 g/m^2, 21.25 lb)	

C. Machine specifications

Power Requirements	DC 24 V ± 10 % (supplied from the main body)
	DC 5 V ± 5 %
Max. Power Consumption	45 W or less
Dimensions	570 mm (W) × 548 mm (D) × 263 mm (H) 22.5 inch (W) × 21.5 inch (D) × 10.25 inch (H)
Weight	26.0 kg (57.25 lb)

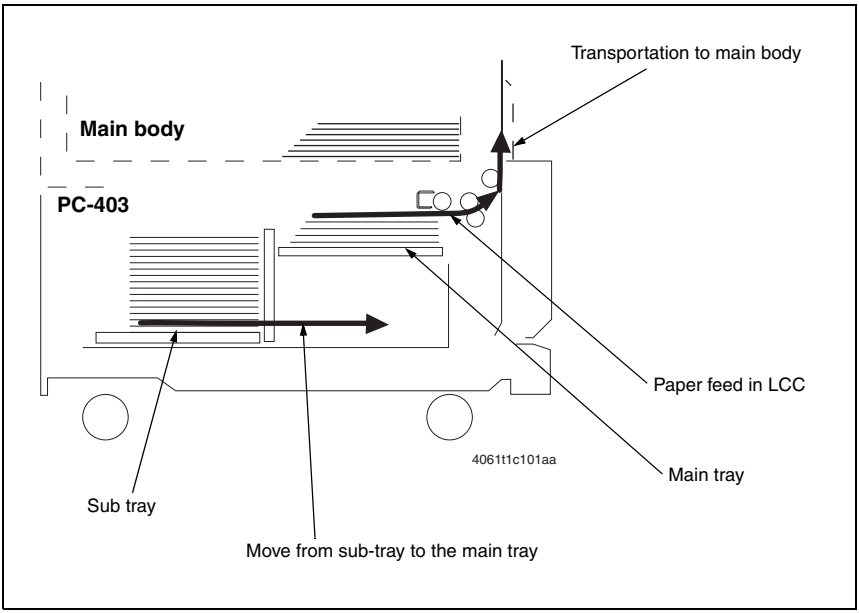
D. Operating environment

Conforms to the operating environment of the main body.

NOTE

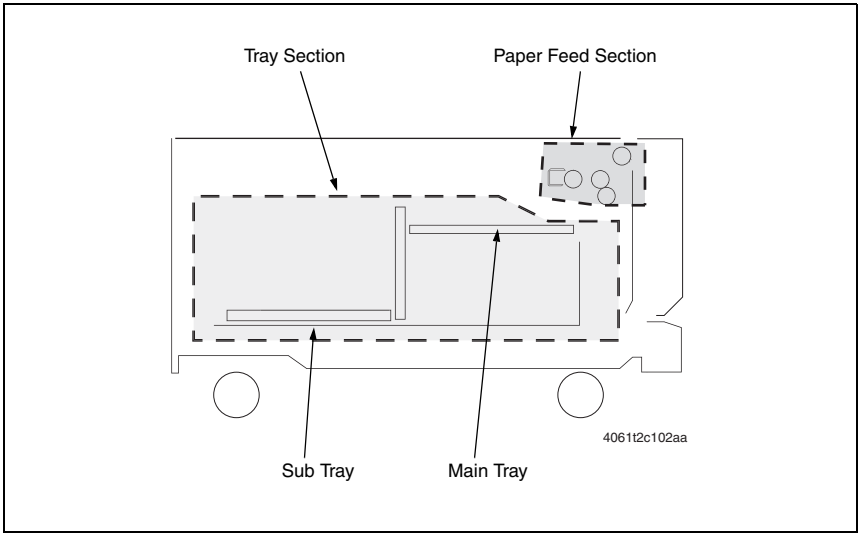
- **These specifications are subject to change without notice.**

2. Paper Feed Path

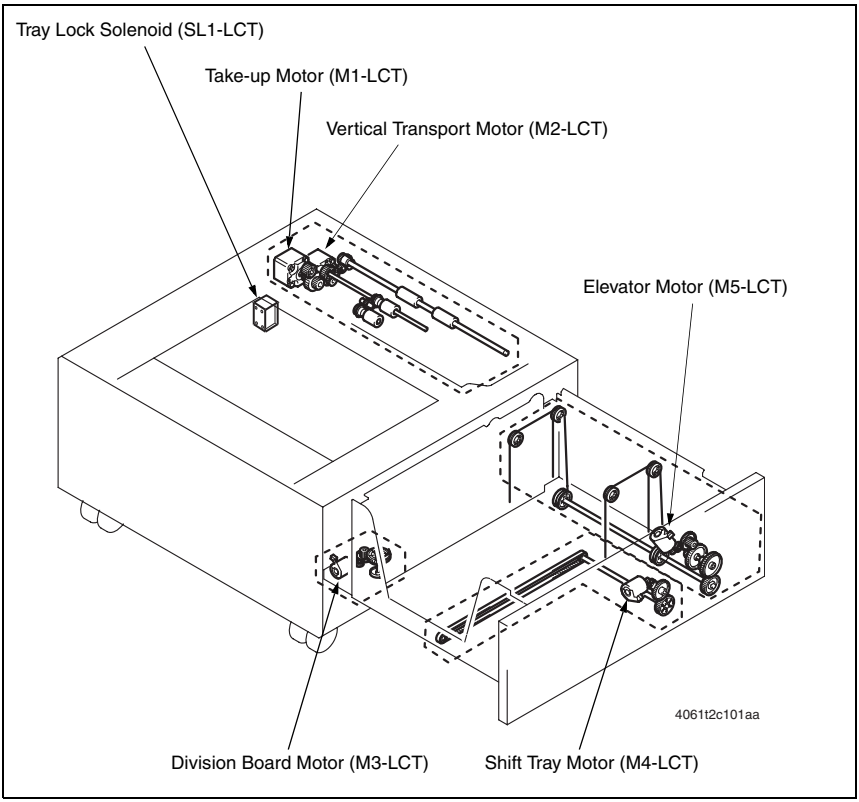


Composition/Operation

3. Composition



4. Drive

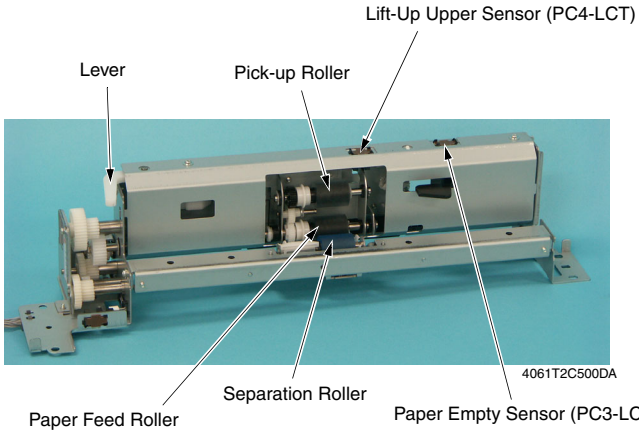

Tray Lock Solenoid (SL1-LCT)
Take-up Motor (M1-LCT)
Vertical Transport Motor (M2-LCT)
Elevator Motor (M5-LCT)
4061t2c101aa
Division Board Motor (M3-LCT)
Shift Tray Motor (M4-LCT)

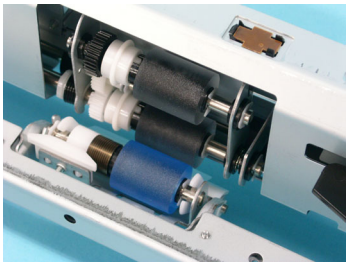
5. Operations

5.1 Paper Feed Section

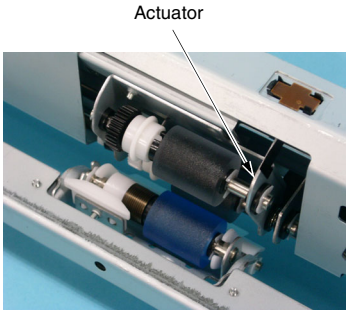
5.1.1 Paper Feed drive mechanism

- The Take-up Motor drives the Pick-up Roller and Paper Feed Roller to take up and feed a sheet of paper into the main body.
- Then, the Vertical Transport Motor transports the paper through the vertical transport section.
- The Pick-up Roller takes up sheets of paper and the Paper Feed and Separation Rollers ensure that only one sheet of paper is separated and fed into the main body.
- When the drawer is slid in, the lever is pushed to lower the Pick-up Roller.
- The Lift-Up Upper Sensor then detects the upper limit position when the paper lifting plate is raised.
- The Paper Empty Sensor detects when paper in the drawer runs out.





Pick-up Roller Home Position

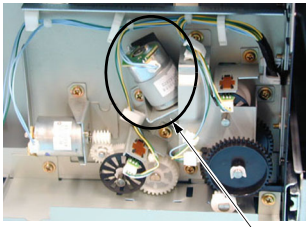


Pick-up Roller Feed Position

5.2 Tray Section

5.2.1 Elevator tray mechanism

- The Main Tray is suspended by the cables at the front and rear.
- As the Elevator Motor turns forward or backward, the cables are wound to raise or lower the tray.
- The Lift-Up Lower Sensor detects the tray at its lower limit position.



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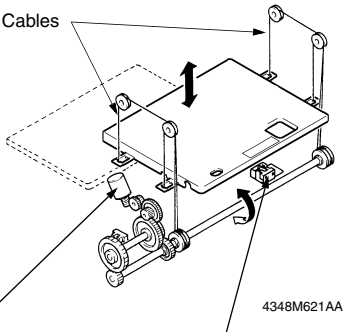

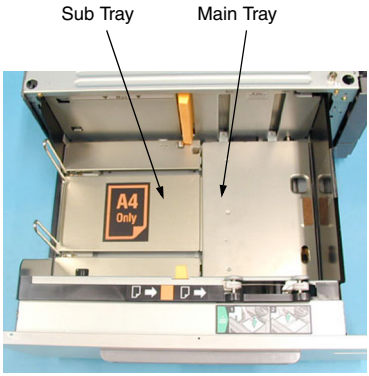

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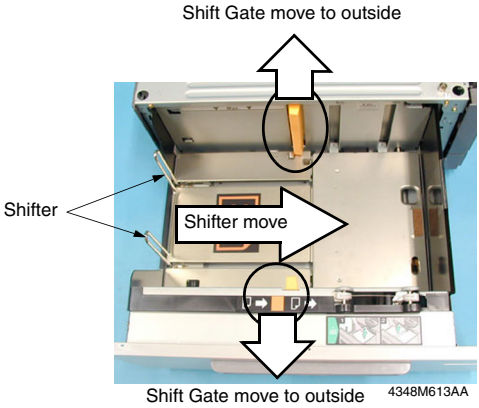
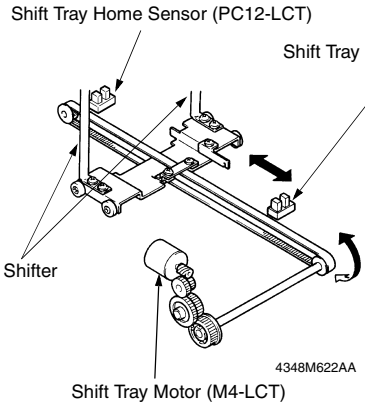
5.2.2 Shift Gate drive mechanism

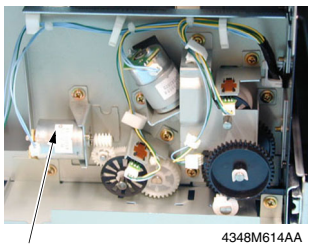
- If the Main Tray runs out of paper, while the Sub Tray is loaded with paper, the paper stack on the Sub Tray is moved to the Main Tray.
- At this time, the Division Board Motor is energized to retract the front and rear Shift Gates.



5.2.3 Shifter drive mechanism

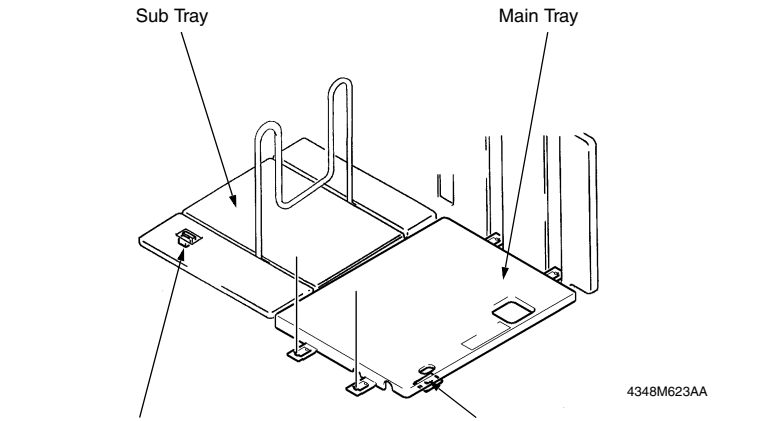
- Then, the Shift Tray Motor is energized to move the Shifter so that the paper stack on the Sub Tray is moved onto the Main Tray.
- The Shifter continues moving and stops when the Shift Tray Stop Sensor is activated. When the Drawer Release button is thereafter pressed, the Shifter starts moving and stops as soon as the Shift Tray Home Sensor is activated.





5.2.4 Paper empty detection

- Paper empty detection of Main Tray is performed by Main Tray Empty Sensor Board.
- Paper empty detection of Sub Tray is performed by Shift Tray Empty Sensor.



KONICA MINOLTA

SERVICE MANUAL

THEORY OF OPERATION

AD-503

2006.02

KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 2.0

Revision history

After publication of this service manual, the parts and mechanism may be subject to change for improvement of their performance.
Therefore, the descriptions given in this service manual may not coincide with the actual machine.

When any change has been made to the descriptions in the service manual, a revised version will be issued with a revision mark added as required.

Revision mark:

- To indicate clearly a section revised, show △1 to the left of the revised section.
  A number within △1 represents the number of times the revision has been made.

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Date	Service manual Ver.	Revision mark	Descriptions of revision
2006/02	2.0	△1	Error corrections
2005/07	1.0	—	Issue of the first edition

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5.2 Transport Control 6
5.2.1 Duplex Unit Transport Motor Control 6
5.2.2 2-sided printing method 6

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Outline

1. Product specifications

A. Type

Name	Duplex Unit
Type	Switchback and Circulating Duplex Unit
Installation	Mounted on the right side door of main body
Document Alignment	Center

B. Paper type

△1 Type	Plain paper	64 to 90 g/m^2 (17 to 24 lb)
	Thick Paper	91 to 256 g/m^2 (24 to 68 lb)
Size	A5S to A3 Wide, 5.5 × 8.5S to 12 × 18	
Print paper size	width	139.7 to 311.1 mm (5.5 × 12.25 inch)
	length	148.0 to 457.2 mm (5.75 × 18 inch)

C. Machine specifications

Power Requirements	DC 24 V ± 10 % (supplied from the main body)
	DC 5 V ± 5 % (supplied from the main body)
Dimensions	110 mm (W) × 440 mm (D) × 345 mm (H) 4.25 inch (W) × 17.25 inch (D) × 13.5 inch (H)
Weight	3.0 kg (6.5 lb)

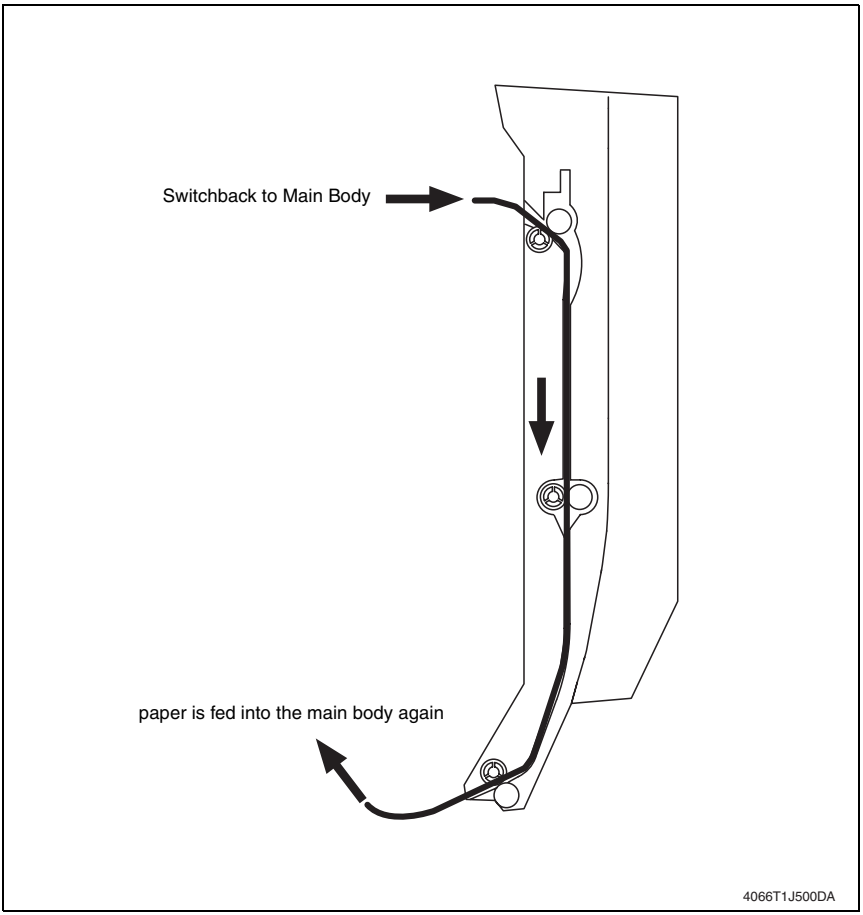
D. Operating environment

Conforms to the operating environment of the main body.

NOTE

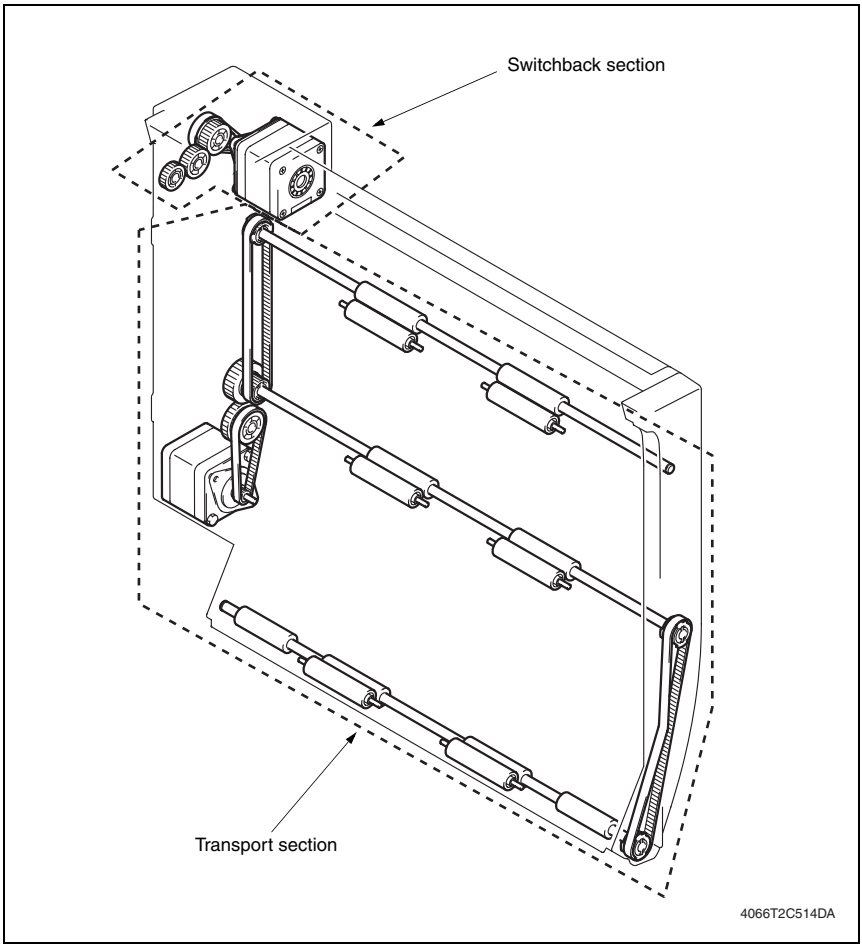
- **These specifications are subject to change without notice.**

2. Paper Feed Path



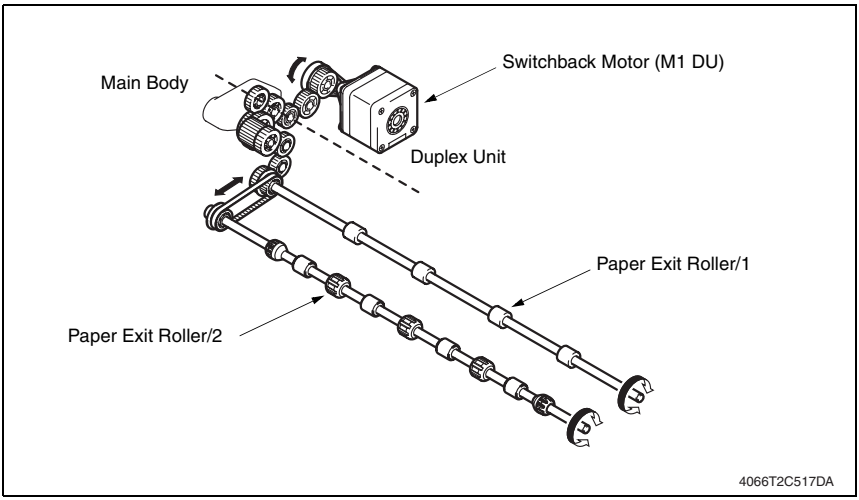
Composition/Operation

3. Composition

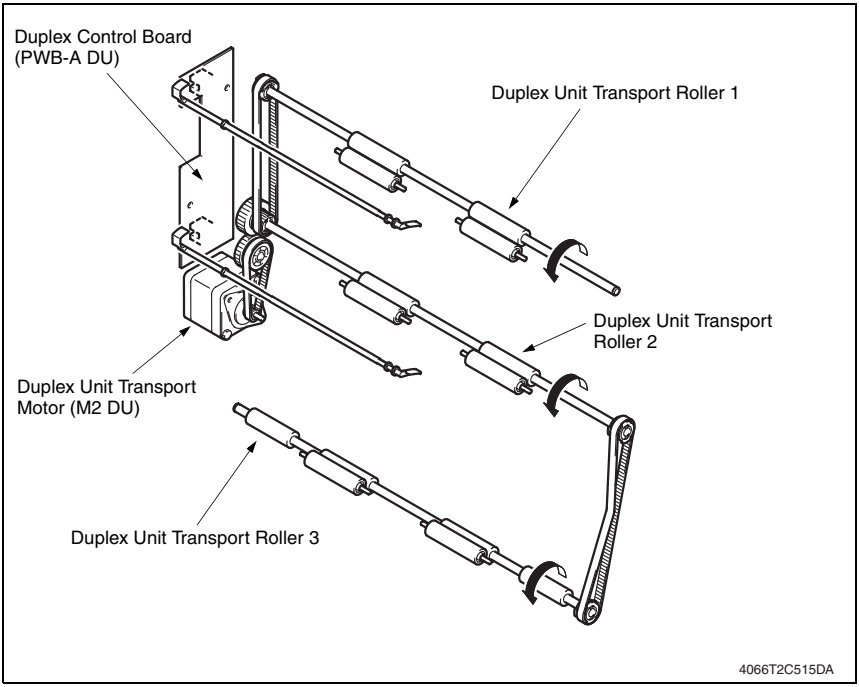


4. Drive

4.1 Switchback Drive



4.2 Transport Drive

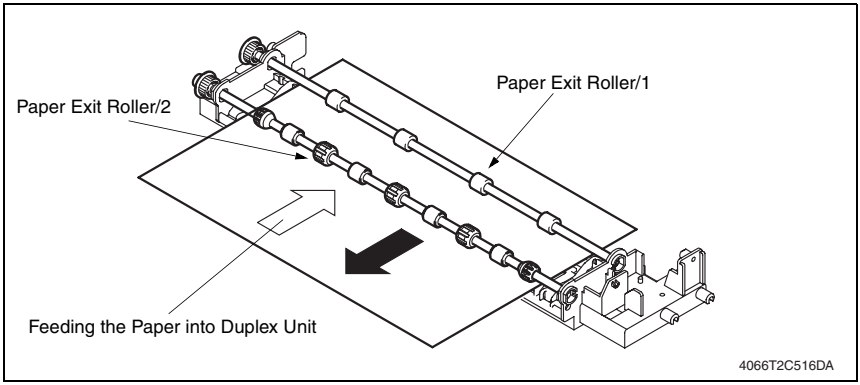


5. Operation

5.1 Switchback mechanism

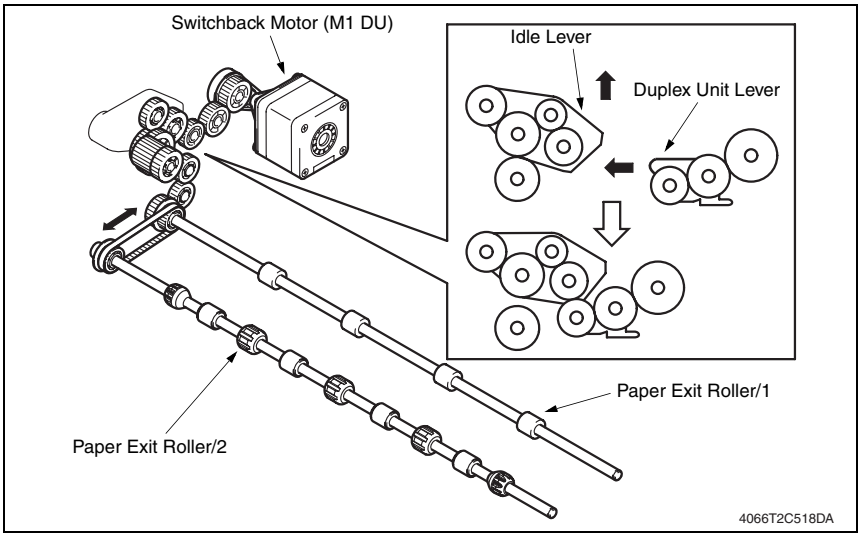
5.1.1 Switchback operation

- The Paper Exit Roller of the main body is used to subject the 1-sided print to a switchback sequence so that the 1-sided print is to be transported through the Duplex Unit.



5.1.2 Paper exit roller drive coupling mechanism

- When the Duplex Unit is mounted, the tip of the Duplex Unit Lever raises the Idle Lever to cut off the drive from the main body (Fusing Rollers) and the Paper Exit Roller is driven by the Switchback Motor.



5.1.3 Switchback Motor Control

- Rotation of the Switchback Motor is controlled by the signals output from the Duplex Control Board.

5.2 Transport Control

5.2.1 Duplex Unit Transport Motor Control

- Rotation of the Duplex Unit Transport Motor is controlled by the signals output from the Duplex Control Board.

5.2.2 2-sided printing method

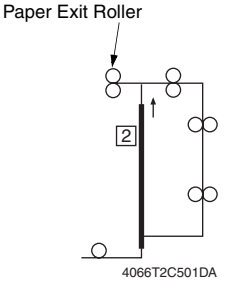
- The following two types of 2-sided printing methods are available.

2-Sided Printing Methods	2-sided printing with a single sheet of paper resident in the system
	2-sided printing with two sheets of paper resident in the system (FD length 215.9 mm or less)

A. Operations in 2-sided printing with a single sheet of paper resident in the system

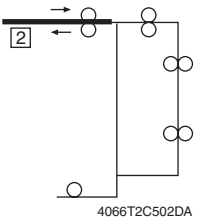
Operation 1

- The first sheet of paper is taken up and fed in from the main body drawer and the main body starts the first print cycle to produce the print image of the second page of the original.



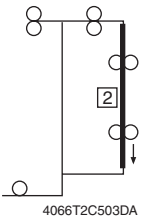
Operation 2

- Immediately before the 1-sided print leaves the Paper Exit Roller, the direction of rotation of the Paper Exit Roller is reversed and the 1-sided print is transported toward and into the Duplex Unit.



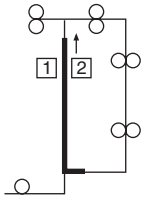
Operation 3

- The 1-sided print moves through the Duplex Unit and is directly subject to the second print cycle without being stopped.



Operation 4

- The main body carries out the second print cycle to produce the print image of the first page of the original on the other side of the 1-sided print.



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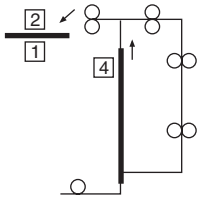
Operation 5

- While feeding the first 2-sided print out of itself, the main body carries out the first print cycle for the second sheet of paper to produce the print image of the fourth page of the original.



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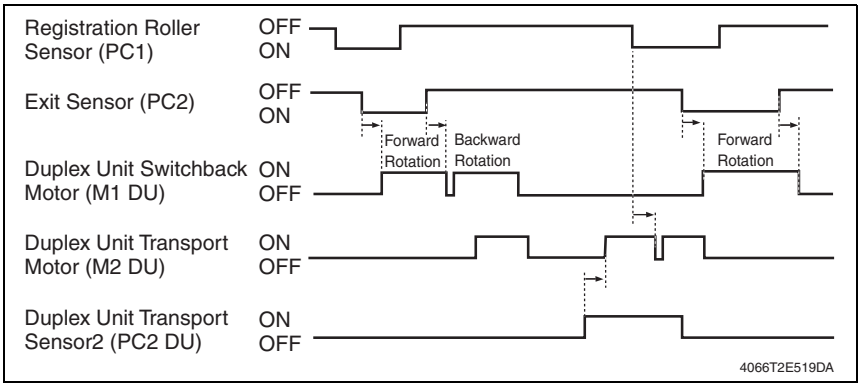
- Steps 2 through 5 are repeated.

- **A4, 2 originals, 1 to 2 print mode**



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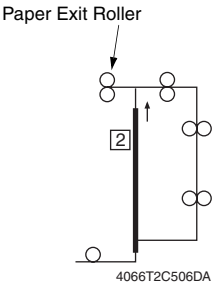
B. Operations in 2-sided printing with two sheets of paper resident in the system

Operation 1

- The first sheet of paper is taken up and fed in from the main body drawer and the main body starts the first print cycle to produce the print image of the second page of the original.



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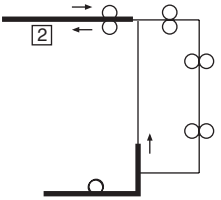
Operation 2

- Immediately before the first 1-sided print leaves the Paper Exit Roller, the direction of rotation of the Paper Exit Roller is reversed and the first 1-sided print is transported toward and into the Duplex Unit.
- At the same time, the second sheet of paper is taken up and fed into the main body.



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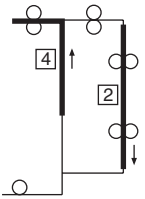
Operation 3

- The main body carries out the first print cycle for the second sheet of paper to produce the print image of the fourth page of the original.
- At the same time, the first 1-sided print is transported through the Duplex Unit.



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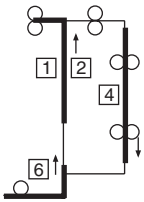
Operation 4

- The main body produces the print image of the first page of the original on the first 1-sided print that has been fed through the Duplex Unit.
- At the same time, the second sheet of paper is subjected to a switchback sequence at the exit section and fed into the Duplex Unit.
- At the same time, the third sheet of paper is taken up and fed into the main body.



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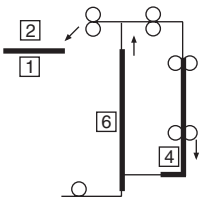
Operation 5

- While feeding the first 2-sided print out, main body produces the print image of the 6th page of the original on the third sheet of paper.
- The second sheet of paper will wait in front of the Duplex Unit Transport Roller 3 until the third sheet of paper has been operated switch back sequence.



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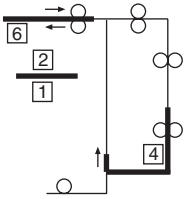
Operation 6

- Immediately before the first 1-sided print leaves the Paper Exit Roller, the direction of rotation of the Paper Exit Roller is reversed and the first 1-sided print for the third sheet is transported toward and into the Duplex Unit.
- At the same time, the second sheet of paper is fed into the main body again.



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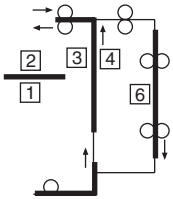
Operation 7

- The main body carries out the first print cycle for the second sheet of paper to produce the print image of the third page of the original.
- At the same time, the first 1-sided print for the third is transported through the Duplex Unit.
- At the same time, the forth sheet of paper is taken up and fed into the main body.



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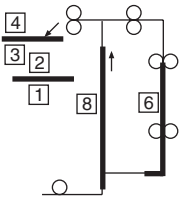
Operation 8

- While feeding the second 2-sided print out, main body produces the print image of the 8th page of the original on the fourth sheet of paper.
- The third sheet of paper will wait in front of the Duplex Unit Transport Roller 3 until the fourth sheet of paper has been operated switch back sequence.



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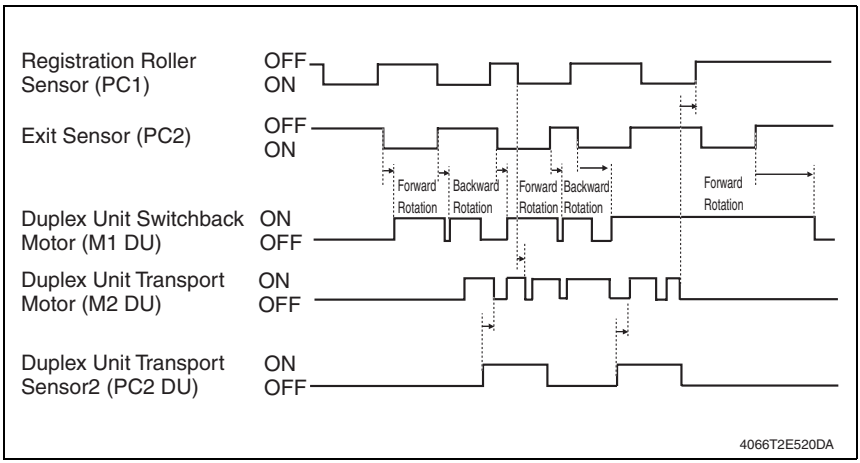
- Steps 6 through 8 are repeated.

- **A4, 2 originals, 2 to 2 print mode**



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KONICA MINOLTA

SERVICE MANUAL

THEORY OF OPERATION

FS-501

2005.07

KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

Revision history

After publication of this service manual, the parts and mechanism may be subject to change for improvement of their performance.
Therefore, the descriptions given in this service manual may not coincide with the actual machine.

When any change has been made to the descriptions in the service manual, a revised version will be issued with a revision mark added as required.

Revision mark:

- To indicate clearly a section revised, show to the left of the revised section.
  A number within represents the number of times the revision has been made.

- To indicate clearly a section revised, show in the lower outside section of the corresponding page.
  A number within represents the number of times the revision has been made.

NOTE

Revision marks shown in a page are restricted only to the latest ones with the old ones deleted.

- When a page revised in Ver. 2.0 has been changed in Ver. 3.0:
  The revision marks for Ver. 3.0 only are shown with those for Ver. 2.0 deleted.
- When a page revised in Ver. 2.0 has not been changed in Ver. 3.0:
  The revision marks for Ver. 2.0 are left as they are.

2005/07	1.0	—	Issue of the first edition
Date	Service manual Ver.	Revision mark	Descriptions of revision

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FS-501

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Outline

1. Product specification

A. Type

Type	Single Staple Finisher
Installation	Freestanding
Document Alignment	Center
Supplies	Staple Cartridge
Option	Job separator (JS-601)

B. Functions

Modes	Group, Sort, Offset/Group, Offset/Sort, Sort Staple and Group Staple

C. Paper type

Mode	Size	Type	Weight	Tray Capacity	Exit Tray	No. of Sheets to be Stapled
Group, Sort	A6S to A3 Wide 5-1/2 × 8-1/2S/ 5-1/2 × 8-1/2 to 12-1/4 × 18	Plain paper	60 to 256 g/m^2 16 to 68 lb	250 sheets	1st Tray	-
		Thick paper		20 sheets		
		OHP Film				
		Translucent paper				
		Postcard				
		Envelope				
		Label paper				
		Letterhead				
Offset/Group, Offset/Sort	B5S/B5 to A3 Wide 7-1/4 × 10-1/2S/ 7-1/4 × 10-1/2 to 12-1/4 × 18	Plain paper	60 to 209 g/m^2 16 to 55-1/2 lb	1,000 sheets (A4S, 8-1/2 × 11S or smaller); 500 sheets (B4, 8-1/2 × 14 or larger)	Elevator Tray	-
		Thick paper				
Sort Staple, Group Staple	B5S/B5 to A3 7-1/4 × 10-1/2S/ 7-1/4 × 10-1/2 to 11 × 17	Plain paper	60 to 90 g/m^2 16 to 24 lb Cover Mode 91 to 209 g/m^2 24-1/4 to 55-1/2 lb	1,000 sheets (A4S, 8-1/2 × 11S or smaller); 500 sheets (B4, 8-1/2 × 14 or larger)	Elevator Tray	30 sheets* (60 to 80 g/m^2, 16 to 21-1/4 lb)

*: 20 sheets if originals of high ID (Color Wise 3) is used.

*: 15 sheets when using Color Copy 90 paper.

*: 20 sheets when using Hammermill Laser Print90 paper.

D. Stapling

Staple Filling Mode	Dedicated Staple Cartridge Mode (3000 staples)
Staple Detection	Available (Nearly Empty: 40 remaining staples)
Stapling Position	Diagonal back side (45 °C) 1 point
	Rear Parallel 1 point
Stapled Paper Size	B5S/B5 to A3 8-1/2 × 11S / 8-1/2 × 11 to 11 × 17
Manual Staple	None

E. Sort and staple capacity

(1) Stacking with no stapling, with the same size paper (80 g/m^2)

- Determined by the item whose value is reached first among number of stacked paper, stacked height or mass of stack.
- Determined by the stacked height when stacking with stapling and no stapling mixed.

Number of stacked paper

FD	No. of Sheets
A4S, 8-1/2 × 11S or smaller	1000 sheets
B4, 8-1/2 × 14 or larger	500 sheets

Stacked height

FD	Height
A4S, 8-1/2 × 11S or smaller	150 mm
B4, 8-1/2 × 14 or larger	75 mm

Mass of stack

FD	Mass
A4S, 8-1/2 × 11S or smaller	correspond to 1000 sheets
B4, 8-1/2 × 14 or larger	correspond to 500 sheets

(2) Stacking with stapling

- (Reference: Actual value) Determined by number of Sets or number of Sheets based on number of bindings.

Number of stacked paper

No. of Sheets to be Stapled	No. of Sets	No. of Sheets
2 pages	100 sets	200 Sheets
3 to 5 pages	80 sets	400 Sheets
6 to 10 pages	60 sets	600 Sheets
11 to 20 pages	40 sets	800 Sheets
21 to 30 pages	33 sets	1000 Sheets

F. Machine specifications

Power Requirements	DC 24 V (supplied from the main body)
	DC 5 V (generated by Finisher)
Max. Power Consumption	63 W or less
Dimensions	538 mm (W) × 637 mm (D) × 978 mm (H) 21-1/4 inch (W) × 25 inch (D) × 38-1/2 inch (H)
Weight	38.1 kg (84 lb)

G. Operating environment

Conforms to the operating environment of the main body.

NOTE

- **These specifications are subject to change without notice.**

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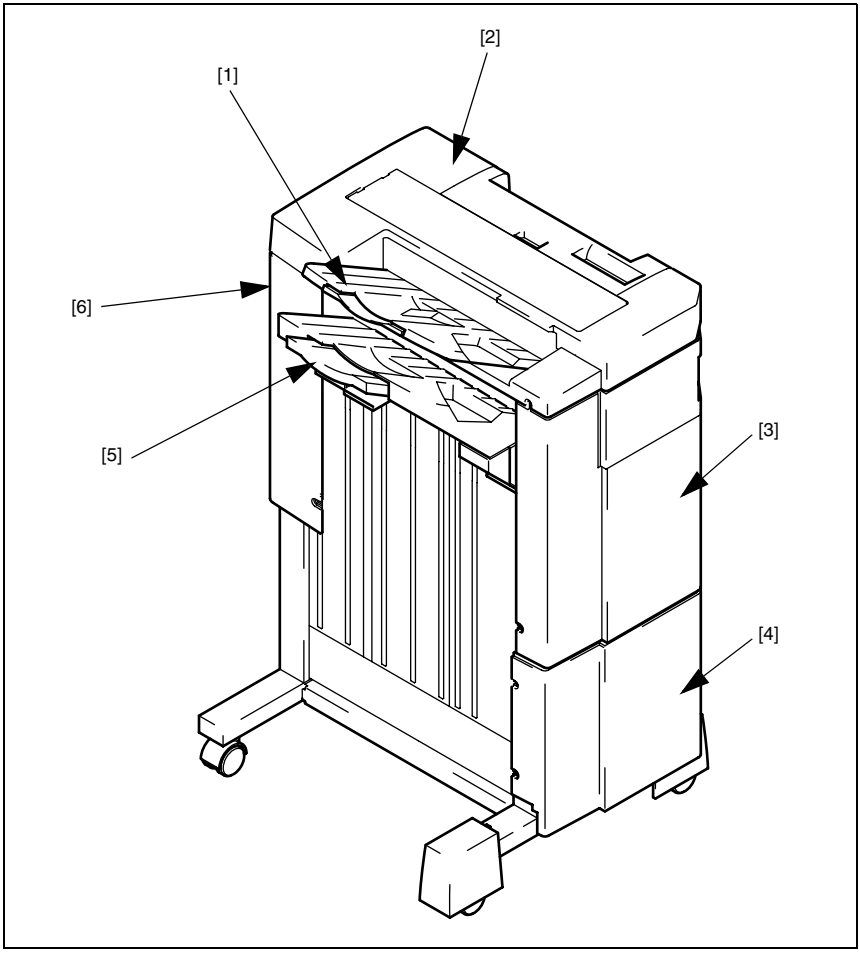
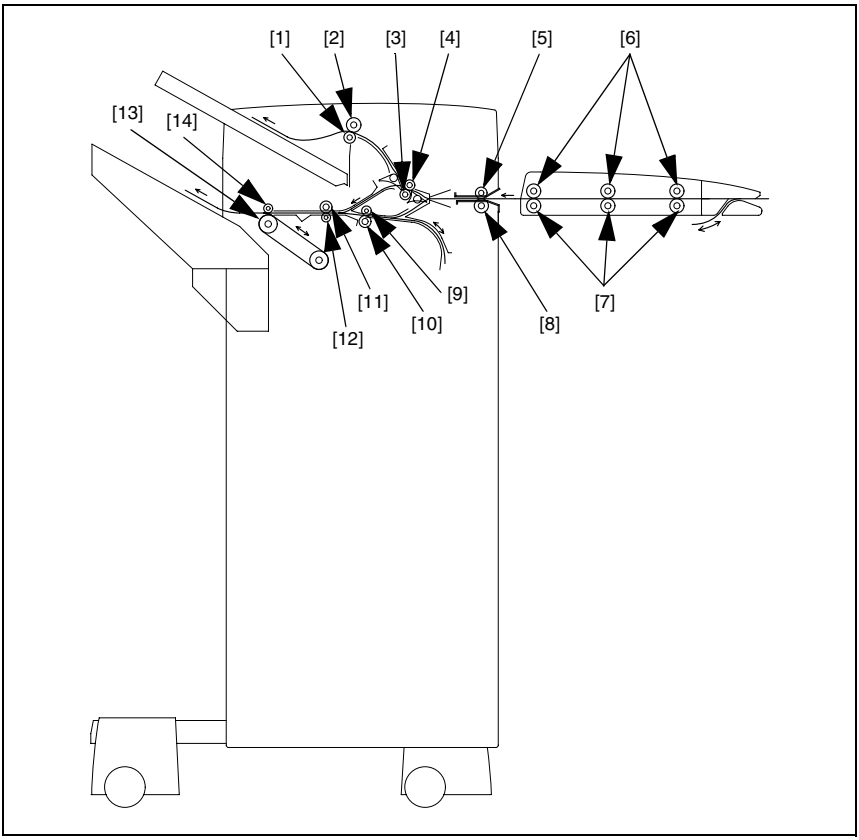
Composition/Operation

2. Overall composition



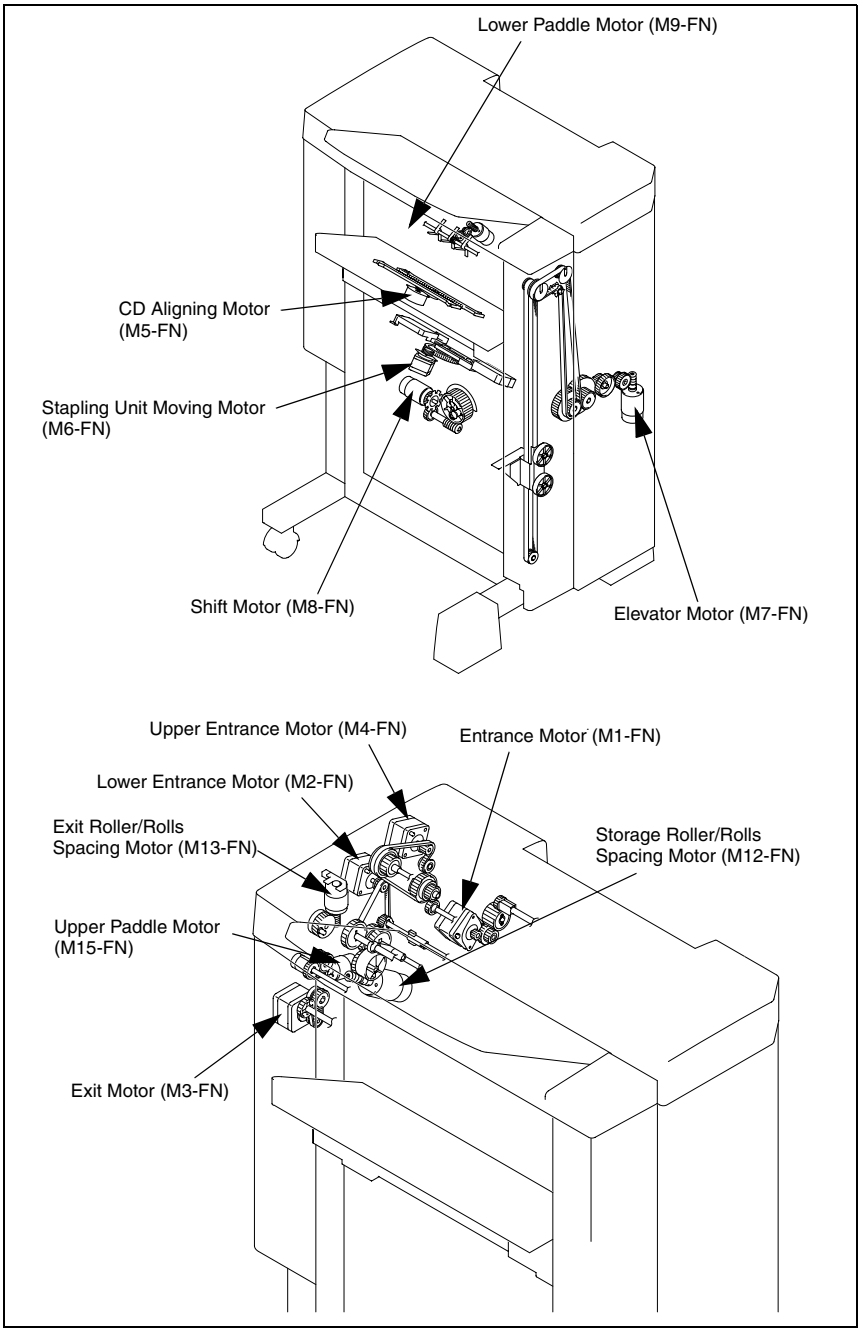
[1] 1st Tray
[2] Upper Cover
[3] Upper Front Cover
[4] Lower Front Cover
[5] Elevator Tray
[6] Rear Cover

3. Center cross section



[1] 1st Tray Exit Roll
[2] 1st Tray Exit Roller
[3] Upper Path Transport Roller
[4] Upper Path Transport Roll
[5] Entrance Roller
[6] Transport Rolls
[7] Transport Rollers
[8] Entrance Roll
[9] Lower Path Transport Roll
[10] Lower Path Transport Roller
[11] Storage Roller
[12] Storage Roll
[13] Exit Roller
[14] Exit Roll

4. Drive system



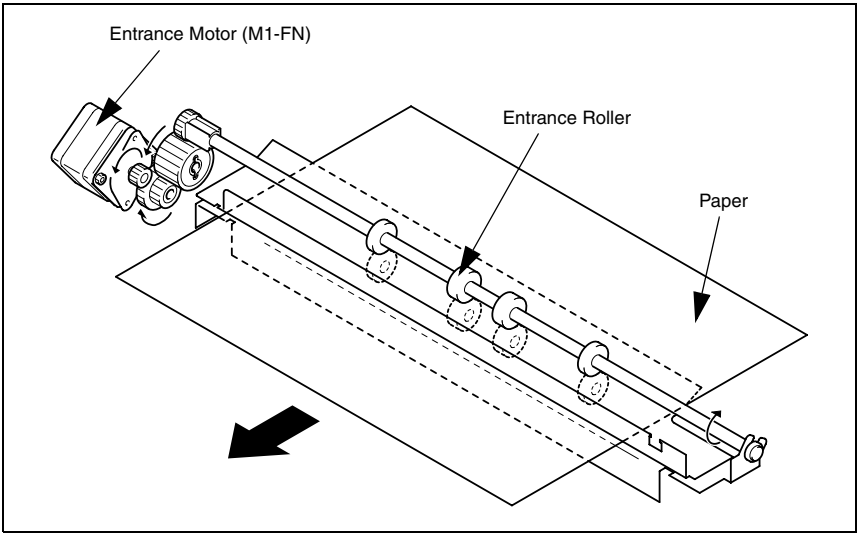
5. Mechanical operations

5.1 Paper transport

5.1.1 Paper transport mechanism

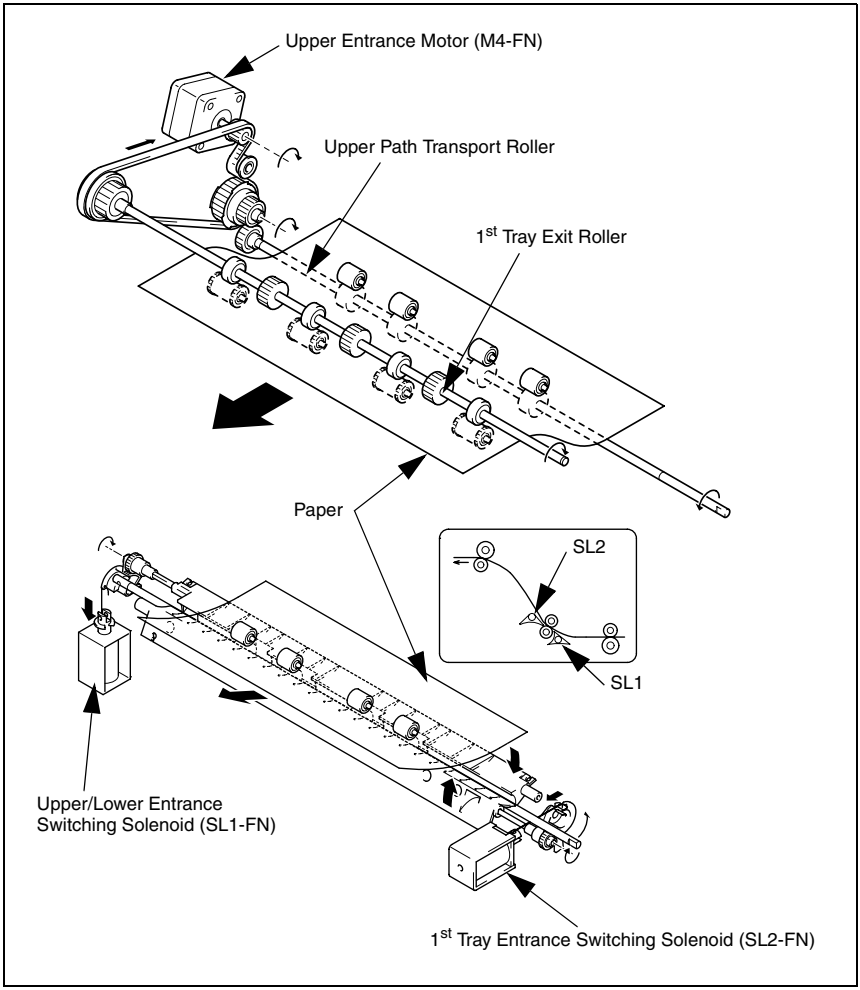
A. Entrance section paper transport mechanism

- The Entrance Roller is turned to transport the paper into the Finisher as the Entrance Motor is energized.



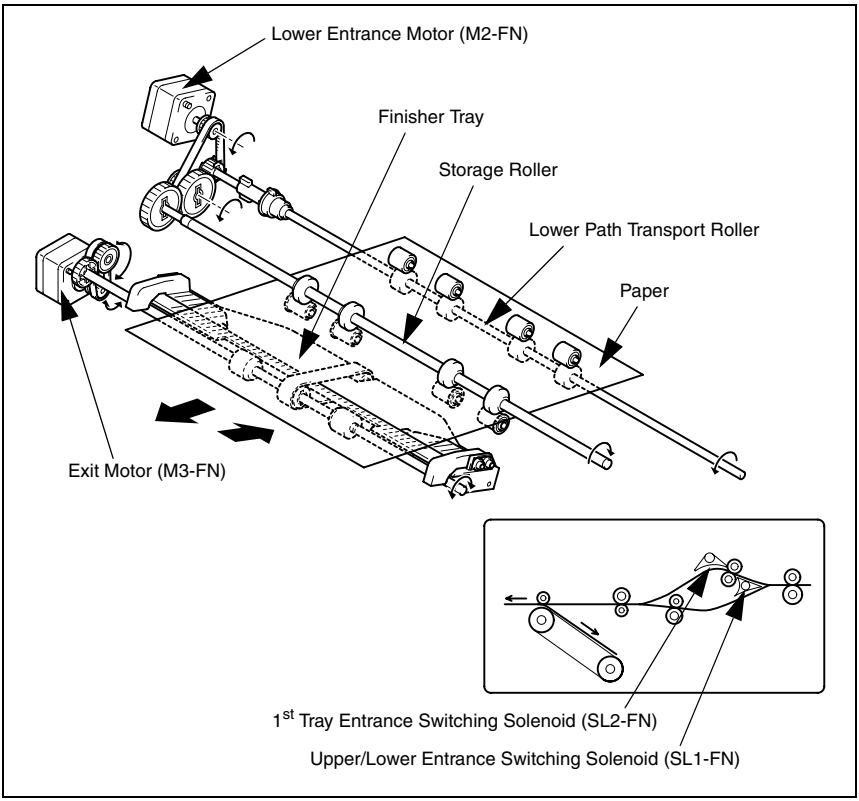
B. 1st tray paper transport mechanism

- Paper transport to the 1st Tray takes place when the Finisher is in the Group/Sort mode.
- The Upper Path Transport Roller and 1st Tray Exit Roller turn to transport the paper into the 1st Tray as the motor is energized.
- The 1st Tray Entrance Switching Solenoid and Upper/Lower Entrance Switching Solenoid are energized to select the paper path into the 1st Tray.



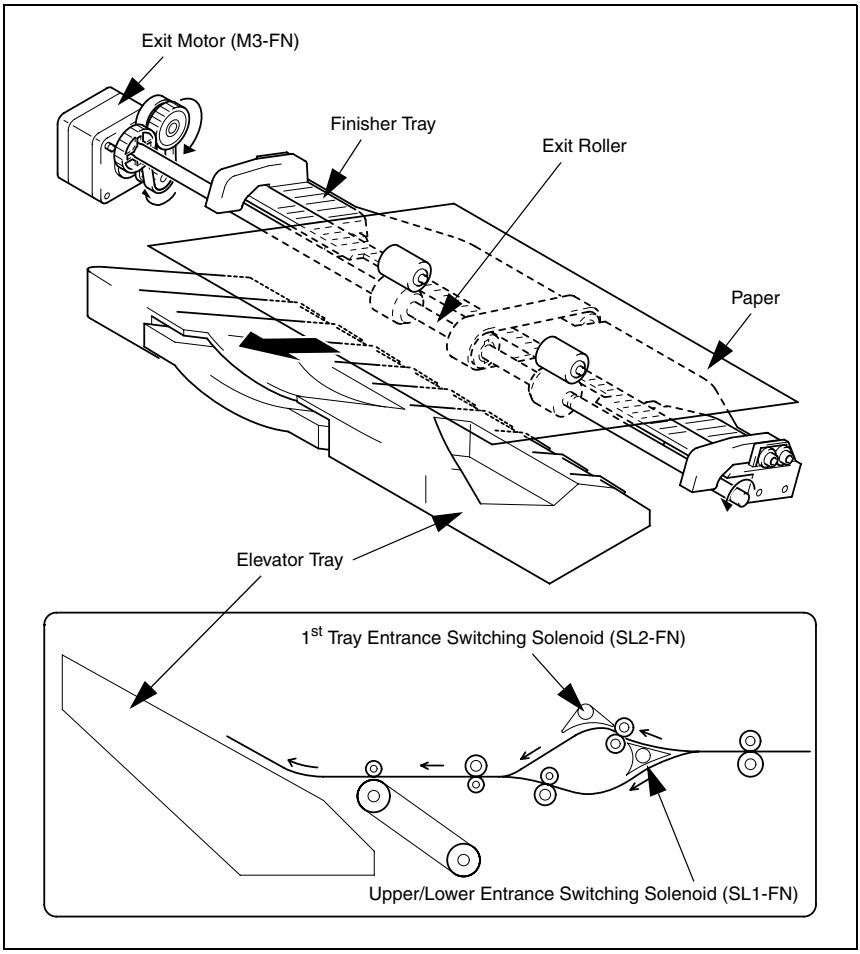
C. Finisher tray paper transport mechanism

- Paper transport to the Finisher Tray takes place when the Finisher is in the Staple mode.
- As the Lower Entrance Motor is energized, the Storage Roller turns to transport the paper toward the exit direction.
- By turning the Exit Motor backward, paper is transported onto the Finisher Tray.
- Either the upper paper path or lower paper path is used to transport paper onto the Finisher Tray.
- The upper paper path is selected when the Upper/Lower Entrance Switching Solenoid is energized, while the 1st Tray Entrance Switching Solenoid is deenergized.
- The lower paper path is selected when the Upper/Lower Entrance Switching Solenoid is deenergized.



D. Elevator tray paper transport mechanism

- Paper transport to the Elevator Tray takes place when the Finisher is in the Group, Sort, Offset/Group or Offset/Sort mode.
- As the motor is energized, the Exit Roller turns to transport the paper into the Elevator Tray.
- Either the upper paper path or lower paper path is used to transport paper onto the Elevator Tray.
- The upper paper path is selected when the Upper/Lower Entrance Switching Solenoid is energized, while the 1st Tray Entrance Switching Solenoid is deenergized.
- The lower paper path is selected when the Upper/Lower Entrance Switching Solenoid is deenergized.

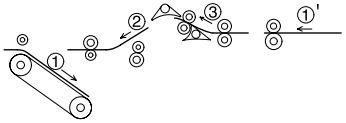


5.1.2 Paper switchback mechanism

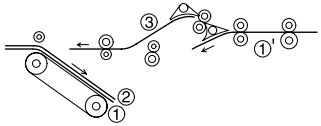
- When the last paper of the first print set is transported onto the Finisher Tray during a multi-print cycle in the Sort Staple mode, the first paper of the subsequent print set, which is to be next transported, undergoes a switchback sequence. The paper for the switchback is transported via the lower paper path.
- The second paper of the second print set is placed over the paper which has undergone the switchback sequence. After the first print set has been fed into the Elevator Tray, the first and second sheets of paper of the second print set are together transported onto the Finisher Tray.
- The switchback sequence of the paper is performed by turning the motor backward, which turns the Lower Path Transport Roller and Storage Roller backward.
- The sheet of paper to be transported next to the one subjected to the switchback sequence is transported via the upper paper path.
- No switchback sequence is carried out if the interval between sheets of paper is wide as when using paper of a large size.

<Three A4 originals for two print sets>

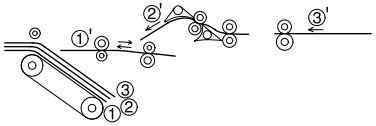
①, ②, ③: Sheets of paper for the first print set
①', ②', ③': Sheets of paper for the second print set



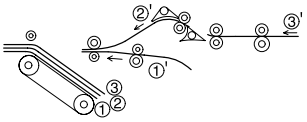
The sheets of paper for the first print are transported via the upper paper path onto the Finisher Tray.



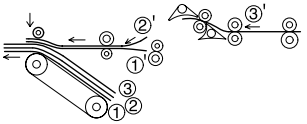
The first sheet of paper of the second print set is transported via the lower paper path.



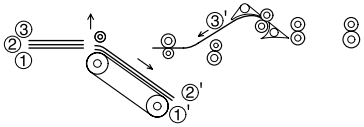
The first sheet of paper of the second print set undergoes the switchback sequence and stops. The second sheet of paper stops as soon as its trailing edge leaves the Entrance Roller.



The first and second sheets of paper of the second print set are transported together, one on top of the other.



The Exit Rolls are pressed against the Exit Roller to feed the sheets of paper of the first print set out. At the same time, the first and second sheets of paper of the second print set are transported toward the exit.



When the first print set is fed out, the Exit Roller starts turning backward to transport the first and second sheets of paper of the second print set to the Finisher Tray. The Exit Rolls leave the Exit Roller.

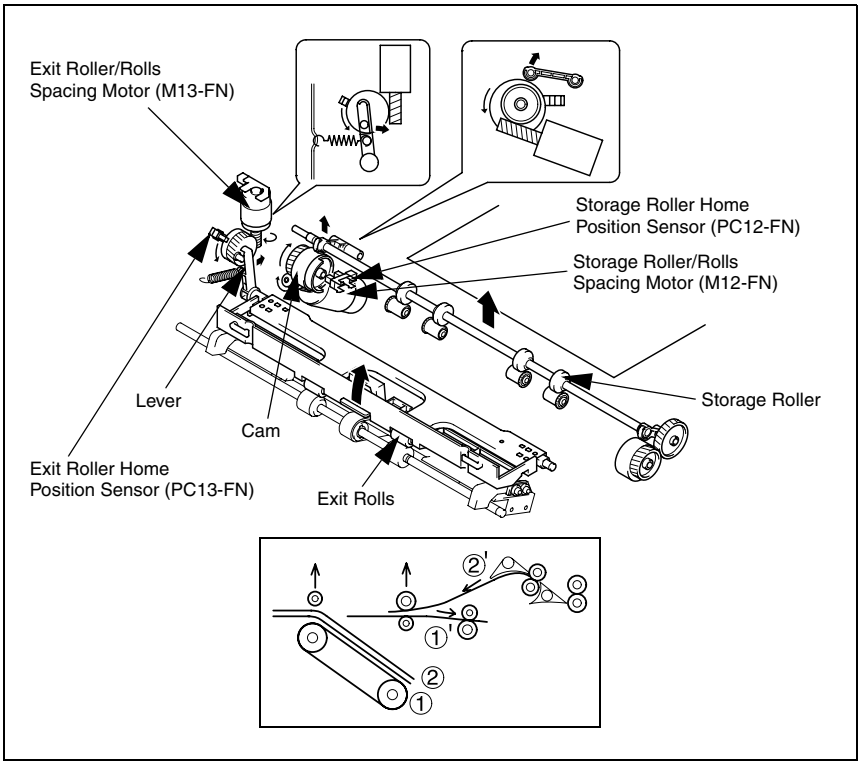
5.1.3 Roller/rolls spacing mechanism

A. Storage roller/rolls spacing mechanism

- The Storage Roller briefly stops when the first sheet of paper completes a switchback sequence during a multi-print cycle in the Sort Staple mode. If, however, paper measures 217 mm or more in the FD direction, the leading edge of the second sheet of paper reaches the Storage Roller before the roller stops turning. The Storage Roller is therefore raised up to allow a given clearance from the Storage Rolls.
- The Storage Roller is spaced from the Storage Rolls as a cam is turned by the corresponding motor.

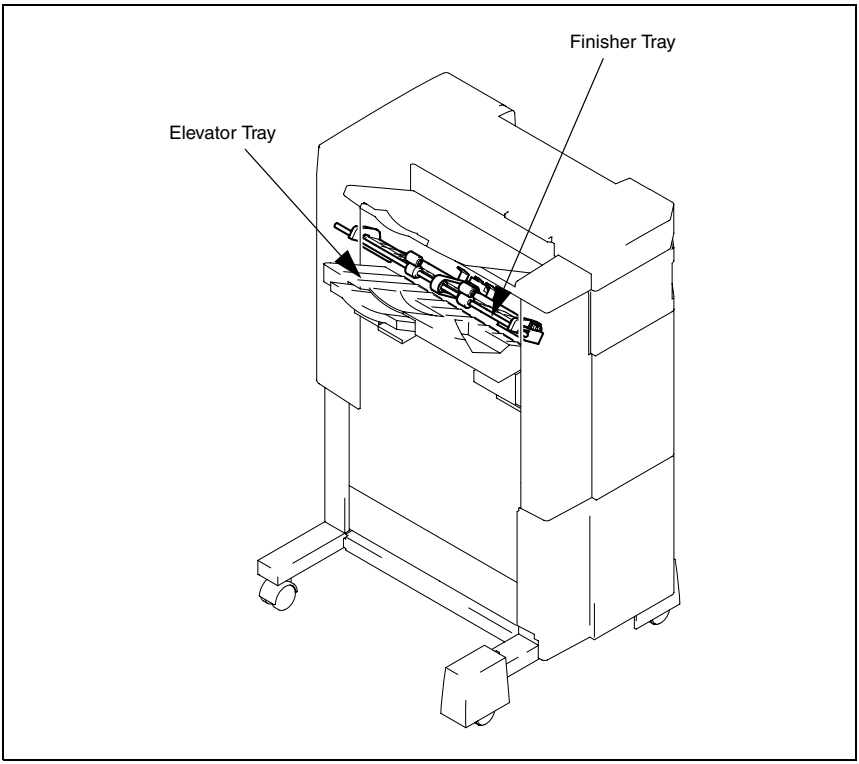
B. Exit roller/rolls spacing mechanism

- Paper needs to be temporarily transported to the Finisher Tray in the Staple mode, which makes it necessary to raise the Exit Rolls to provide a given clearance from the Exit Roller.
- After the stapling sequence has been completed, the Exit Rolls are lowered and pressed against the Exit Roller so that the paper can be fed out.
- The Exit Rolls are spaced from the Exit Roller as a lever is moved to the right and left by the cam which is rotated by the motor.



5.2 Finisher tray

- Sheets of paper are properly aligned and stapled together on the Finisher Tray before being fed out into the Elevator Tray.

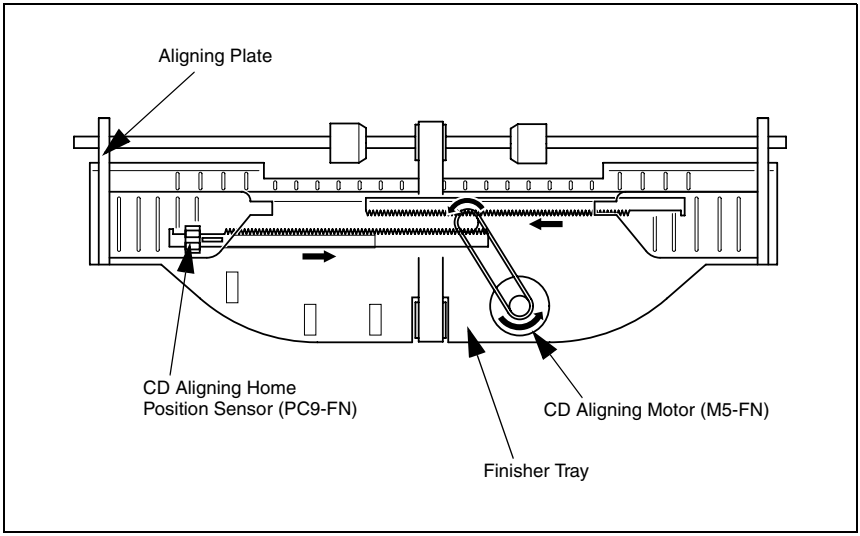


5.2.1 Paper aligning mechanism

- The Aligning Plate is moved and the Paddles are turned to align paper correctly for stapling.

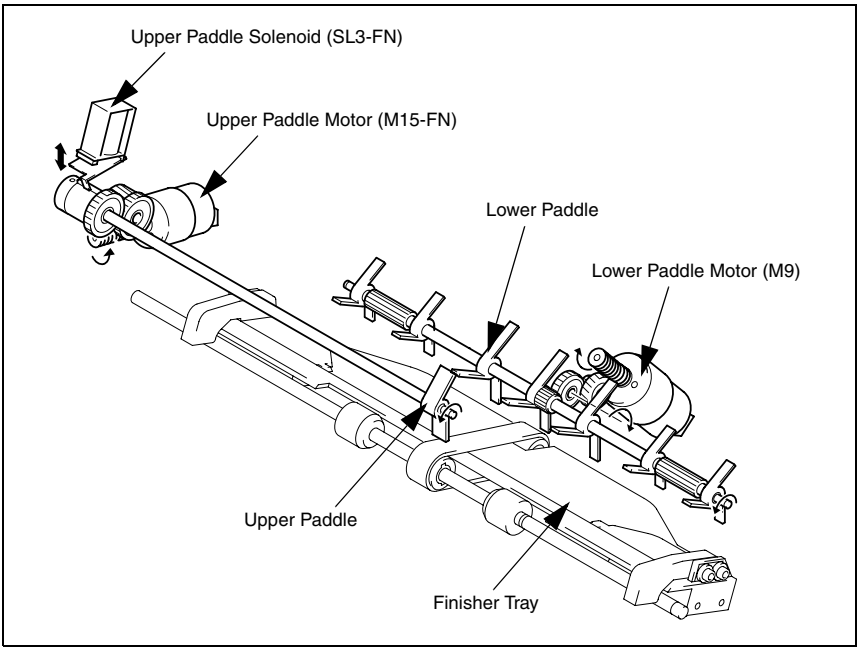
A. Aligning plate

- The Aligning Plate is moved to align the paper in the crosswise direction with reference to the center position of the Finisher Tray.
- The Aligning Plate is moved as the CD Aligning Motor turns forward or backward.
- The CD Aligning Home Position Sensor detects the Aligning Plate at its home position. The movement of the Aligning Plate is determined with this home position used as the reference.
- The movement of the plate is varied depending on the width of the paper.



B. Paddles

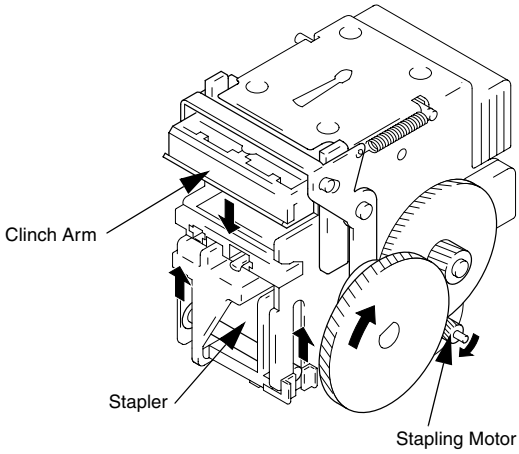
- The Upper and Lower Paddles are turned to align the paper in the feeding direction.
- The Upper Paddles are turned by the Upper Paddle Motor and Upper Paddle Solenoid.
- The Lower Paddles are turned by the Lower Paddle Motor.



5.3 Stapling

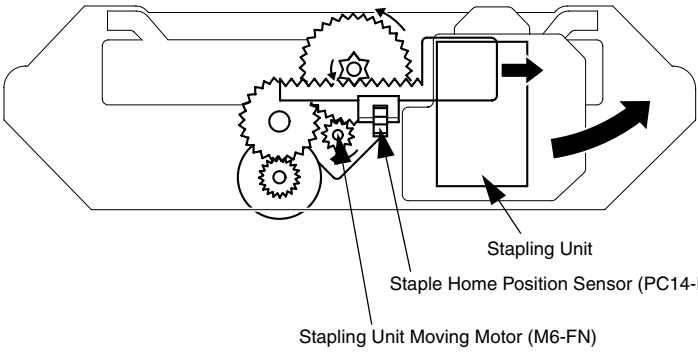
5.3.1 Stapling mechanism

- The Stapling Unit performs the stapling action.
- When the Stapling Motor turns, the Clinch Arm lowers. Then the Stapler moves up to drive a staple into paper and the staple is formed.
- Staple position is the rear corner (stapling) at a point.



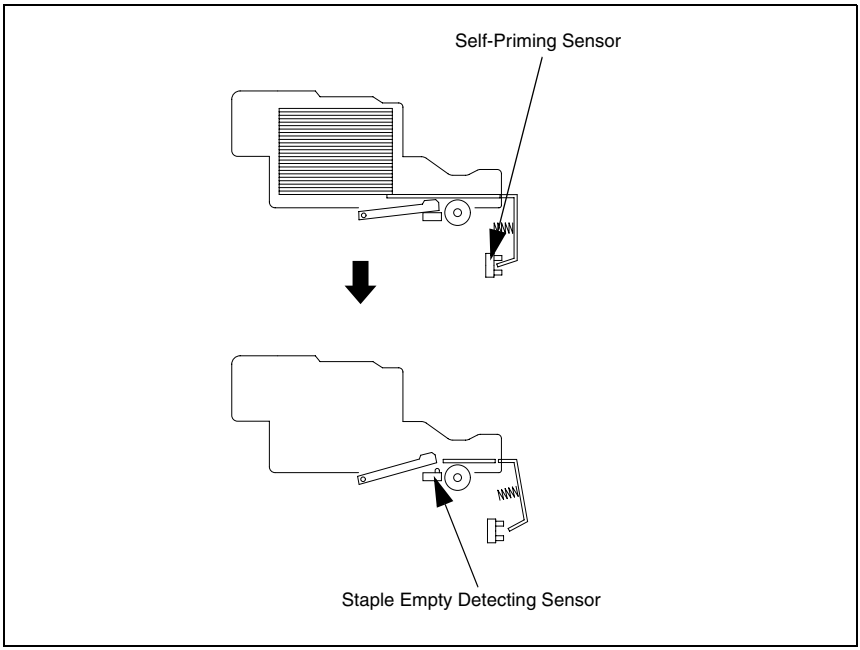
5.3.2 Stapling unit moving mechanism

- Stapling Unit is moved by the Stapling Unit Moving Motor.
- The Staple Home Position Sensor detects Stapling Unit at respective home positions. The Stapling Unit is moved with reference to this home position.



5.3.3 Staple sheet empty detection

- The Staple Empty Detecting Sensor is used to detect whether there is a staple sheet or not in the Staple Cartridge.
- When there are about 20 staples left in the Staple Cartridge, a staple sheet empty condition results and a staple-empty display is given on the control panel of the main body.
- If a staple sheet empty condition is detected during a stapling sequence, that particular sequence is continued until it is completed. A staple empty display is then given.
- After a new Staple Cartridge has been loaded, the Stapling Motor is energized until the Self-Priming Sensor detects loaded staples (L), thereby feeding the staple sheet to the stapling position.



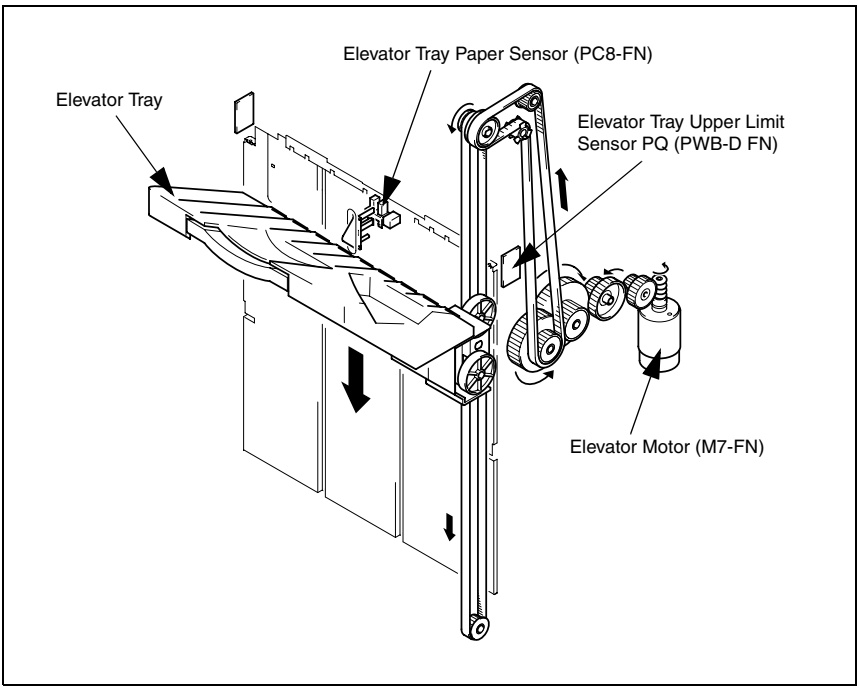
5.4 Elevator tray

- The Elevator Tray moves up or down according to certain conditions.

5.4.1 Elevator tray ascent/descent mechanism

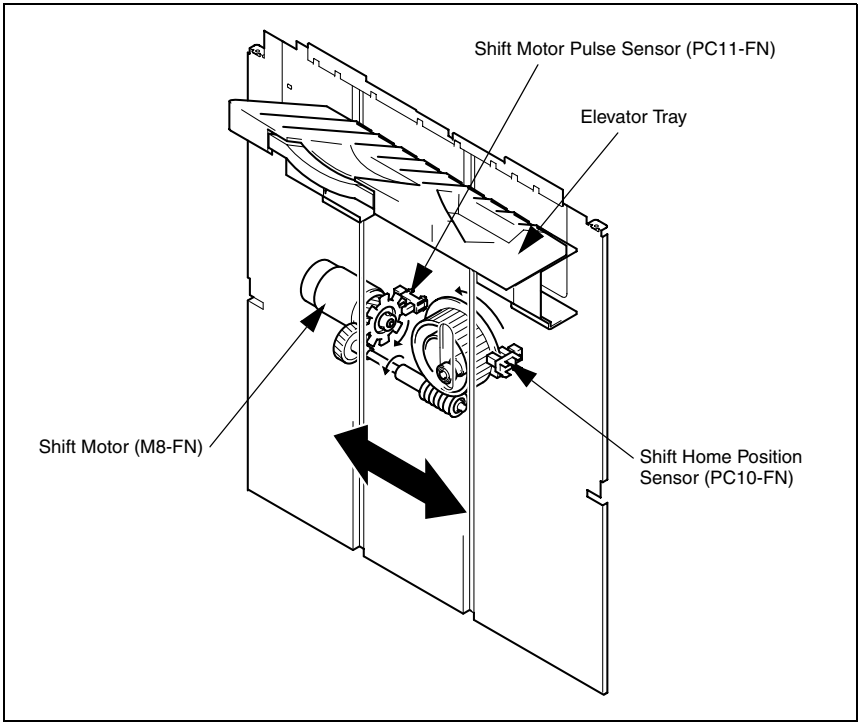
- The Elevator Tray is moved up or down by the Elevator Motor that turns forward or backward.

Condition	Elevator Tray	Control
Standby	Stationary at the upper limit position.	The position at which the Elevator Tray Upper Limit Sensor PQ (PWB-D FN) detects the Elevator Tray.
Paper fed into tray	Lowers to the lower limit position depending on the number of sheets of paper to be fed into the tray.	If the Elevator Tray Upper Limit Sensor PQ (PWB-D FN) is activated while paper is being fed into the tray, the tray is lowered until the sensor is deactivated.
Paper removed from tray	Moves up to the upper limit position.	If the Elevator Tray Paper Sensor (PC8-FN) is unblocked when paper is removed from the tray, the tray is raised until the sensor is blocked.
Overload detected	Moves down and then up after paper has been fed into tray.	Lowers the tray for a given period of time, then raises it to the upper limit position. An overcurrent is detected in the Elevator Motor during this period.

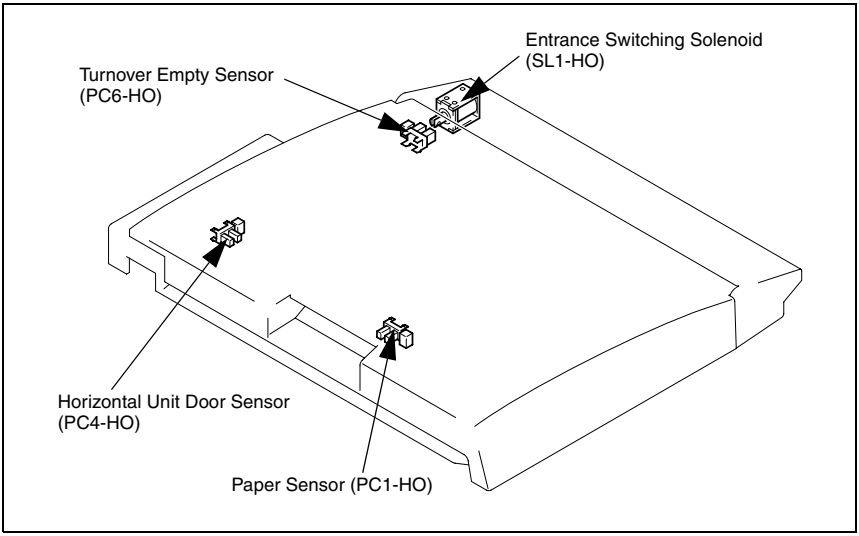


5.4.2 Elevator tray shifting mechanism

- When in the Sort mode, the Elevator Tray is moved to the front and rear by a motor to stack print sets in a sawtooth manner so that each print set is offset with respect to the others.
- The Shift Home Position Sensor detects the Elevator Tray at its home position.



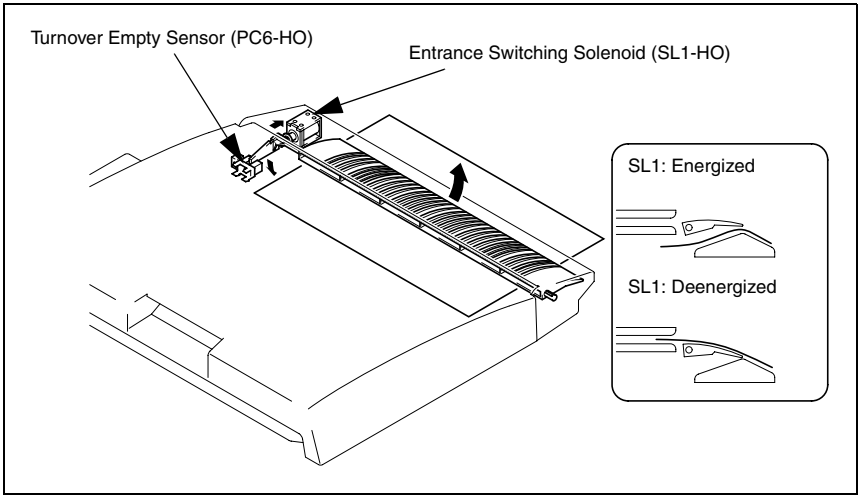
5.5 Horizontal transport unit



5.5.1 Paper transport mechanism

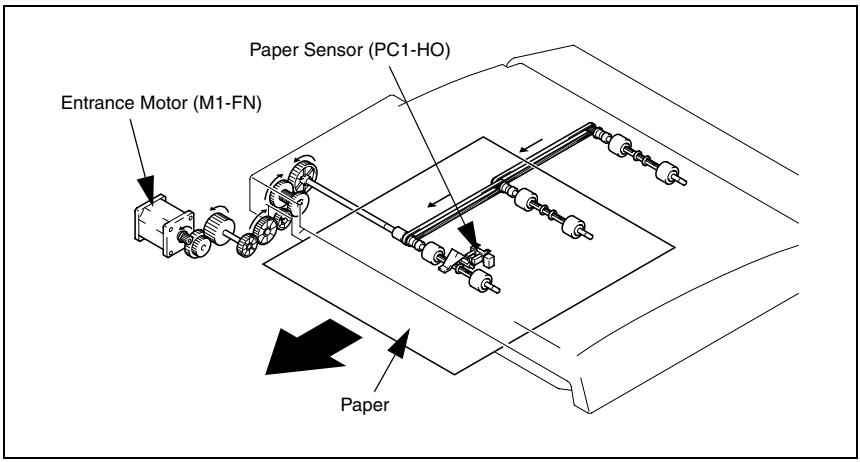
A. Paper path switching mechanism

- The paper fed from the main body moves through either one of the two different paper paths.
- A solenoid is used to select the paper path.
  For switchback sequence during 2-sided printing: Solenoid energized
  For transport onto the Finisher: Solenoid deenergized



B. Finisher paper transport mechanism

- A motor is employed to transport paper onto the Finisher.
- The Paper Sensor functions to detect a sheet of paper present in the Horizontal Transport Unit.



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KONICA MINOLTA

SERVICE MANUAL THEORY OF OPERATION

FS-514/PK-510 /OT-601

2006.08
KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

Revision history

After publication of this service manual, the parts and mechanism may be subject to change for improvement of their performance.
Therefore, the descriptions given in this service manual may not coincide with the actual machine.

When any change has been made to the descriptions in the service manual, a revised version will be issued with a revision mark added as required.

Revision mark:

- To indicate clearly a section revised, show to the left of the revised section.
  A number within represents the number of times the revision has been made.

- To indicate clearly a section revised, show in the lower outside section of the corresponding page.
  A number within represents the number of times the revision has been made.

NOTE

Revision marks shown in a page are restricted only to the latest ones with the old ones deleted.

- When a page revised in Ver. 2.0 has been changed in Ver. 3.0:
  The revision marks for Ver. 3.0 only are shown with those for Ver. 2.0 deleted.
- When a page revised in Ver. 2.0 has not been changed in Ver. 3.0:
  The revision marks for Ver. 2.0 are left as they are.

2006/08	1.0	—	Issue of the first edition
Date	Service manual Ver.	Revision mark	Descriptions of revision

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Outline

1. Product specifications

1.1 FS-514

A. Type

Name	Multi staple finisher built into the copier
Installation	Installed in the copier
Document alignment	Center
Consumables	Staples

B. Functions

Modes	Sort, group, sort offset, group offset, sort stable, and punch (when PK-510 is mounted)

C. Paper type

(1) Non sort/sort/group

<table>
<tr><th>Type</th><th>Size</th><th>Weight</th><th colspan="3">Max. capacity</th></tr>
<tr><td rowspan="3">Plain paper
Recycled paper</td><td rowspan="12">A6S, A5S/A5, B5S/B5, B6S, A4S/A4, B4, A3, A3Wide
5 1/2 x 8 1/2S/5 1/2 x 8 1/2,
8 1/2 x 11S/8 1/2 x 11,
8 1/2 x 14, 11 x 17,
12 1/4 x 18

Max.
311.15 mm x 457.2 mm
12.25 x 18 inch
Min.
90 mm x 139.7 mm
3.5 x 5.5 inch</td><td rowspan="3">50 to 90 g/m2
13.25 to 24 lb</td><td>Exit tray1</td><td colspan="2">200 sheets</td></tr>
<tr><td rowspan="2">Exit tray2</td><td>A4S, 8 1/2 x 11S or less</td><td>1000 sheets</td></tr>
<tr><td>B4, 8 1/2 x 14 or greater</td><td>500 sheets</td></tr>
<tr><td>Government standard postcards</td><td>91 to 210 g/m2
24.25 to 55.75 lb</td><td colspan="3" rowspan="9">20 sheets</td></tr>
<tr><td>Envelope</td><td>-</td></tr>
<tr><td>OHP trans-parencies</td><td>-</td></tr>
<tr><td>Translucent paper</td><td>-</td></tr>
<tr><td>Label</td><td>-</td></tr>
<tr><td>Letterhead</td><td>-</td></tr>
<tr><td>Thick paper 1</td><td>91 to 150 g/m2
24.25 to 40 lb</td></tr>
<tr><td>Thick paper 2</td><td>151 to 209 g/m2
40 to 55.5 lb</td></tr>
<tr><td>Thick paper 3</td><td>210 to 256 g/m2
55.75 to 68 lb</td></tr>
<tr><td>Long size paper *</td><td>210 mm to 297 mm x 1200 mm or under</td><td>127 to 160 g/m2
33.75 to 42.5 lb</td><td colspan="3">-</td></tr>
</table>

*: Long size paper is available only for non-sort mode.

(2) Sort offset/group offset

<table>
<tr><th>Type</th><th>Size</th><th>Weight</th><th colspan="3">Max. capacity</th></tr>
<tr><td rowspan="3">Plain paper
Recycled paper</td><td rowspan="3">A5, B5S/B5, A4S/A4, B4, A3
8 1/2 x 11S/8 1/2 x 11, 8 1/2 x 14, 11 x 17
Max. 297 mm x 431.8 mm
11.75 x 17 inch
Min. 182 mm x 148.5 mm
7.25 x 5.75 inch</td><td rowspan="3">50 to 90 g/m2
13.25 to 24 lb</td><td>Exit tray1</td><td colspan="2">200 sheets</td></tr>
<tr><td rowspan="2">Exit tray2</td><td>A4S, 8 1/2 x 11S or less</td><td>1000 sheets</td></tr>
<tr><td>B4, 8 1/2 x 14 or greater</td><td>500 sheets</td></tr>
<tr><td>Thick paper</td><td>91 to 256 g/m2
24.25 to 68 lb</td><td colspan="3">-</td></tr>
</table>

(3) Sort staple

<table>
<tr><th>Type</th><th>Size</th><th>Weight</th><th colspan="3">Max. capacity</th><th>No. of sheets to be stapled</th></tr>
<tr><td rowspan="3">Plain paper
Recycled paper</td><td rowspan="3">A5, B5S/B5, A4S/A4, B4, A3
8 1/2 x 11S/8 1/2 x 11, 8 1/2 x 14, 11 x 17
Max. 297 mm x 431.8 mm
11.75 x 17 inch</td><td rowspan="3">50 to 90 g/m2
13.25 to 24 lb</td><td>Exit tray1</td><td colspan="2">200 sheets</td><td rowspan="3">50 sheets*1
(30 sheets *2, *3)</td></tr>
<tr><td rowspan="2">Exit tray2</td><td>A4S, 8 1/2 x 11S or less</td><td>1000 sheets</td></tr>
<tr><td>B4, 8 1/2 x 14 or greater</td><td>500 sheets</td></tr>
<tr><td>Thick paper</td><td>Min. 182 mm x 148.5 mm
7.25 x 5.75 inch</td><td>91 to 120 g/m2
24.25 to 32 lb</td><td colspan="3">-</td><td>30 sheets</td></tr>
</table>

*1: The number of sheets to be stapled is limited for high-density images.
(Color wise: 20 sheets x 20 sets)

*2: Only for north America.

*3: Only for the 8 1/2 x 14 or greater paper.

(4) Punch

<table>
<tr><th>Type</th><th>Size</th><th>Weight</th><th>Punched holes</th><th>Exit tray</th></tr>
<tr><td>Plain paper
Recycled paper</td><td>B5S/B5 to A3
8 1/2 x 11S/8 1/2 x 11 to 11 x 17</td><td>50 to 209 g/m2
13.25 to 55.5 lb</td><td>2, 3, 4 *</td><td>Exit Tray1
Exit Tray2
OT-601
MT-501</td></tr>
</table>

*: The punched holes is different because of the difference of area.

D. Stapling

Staple filling mode	Dedicated staple cartridge (5000 staples)	
Staple detection	Available (Nearly Empty: 20 remaining staples)	
Stapling position	Back of the corner (30 degree)	A4, A3, B5, B4 8 1/2 x 11, 11 x 17
	Front of the corner (30 degree)	
	Back of the corner (Parallel)	A4S, B5S, A5 8 1/2 x 11S, 8 1/2 x 14
	Front of the corner (Parallel)	
	Side: Parallel 2 point	A4S/A4, A3, B5S/B5, B4, A5 8 1/2 x 11S/8 1/2 x 11, 8 1/2 x 14, 11 x 17
Manual staple	None	

E. Hole Punch

No. of holes	Metric: 4 holes, Inch: 2 holes/3 holes, Sweden: 4 holes
Punch dust full detection	Available

F. Machine specifications

Power requirements	DC 24 V (supplied from the main unit)
	DC 5.1 V (generated by finisher)
Max. power consumption	66 W or less
Dimensions	352 mm (W) x 558 mm (D) x 573 mm (H) 13.75 inch (W) x 22 inch (D) x 22.5 inch (H)
Weight	33.2 kg (73.25 lb)

G. Operating environment

- Conforms to the operating environment of the main unit.

1.2 PK-510

A. Type

Name	Punch kit PK-510	
Installation	Built into the finisher	
Paper size	Metric	B5S, A4, B4, A3
	Inch (2 holes)	8 1/2 x 11S/8 1/2 x 11, 8 1/2 x 14, 11 x 17
	Inch (3 holes)	8 1/2 x 11, 11 x 17
	Sweden	B5S, A4, B4, A3
Paper type	Plain Paper, Recycled paper (50 to 209 g/m^2, 13.25 to 55.5 lb)	
Punch hole	Metric: 4 hole, Inch: 2/3 hole, Sweden: 4 holes	
Number of stored punch wastes	Metric (4 holes): For 1,500 sheets of paper (80 g/m^2) Inch (2/3 holes): For 1,000 sheets of paper (75 g/m^2) Sweden (4 holes): For 1,500 sheets of paper (80 g/m^2)	
Document alignment	Center	

B. Machine specifications

Power requirements	Supplied by the finisher
Dimensions	114 mm (W) x 461 mm (D) x 106 mm (H) 4.5 inch (W) x 18.25 inch (D) x 4.25 inch (H)
Weight	Approx. 1.9 kg (4.25 lb) or less

C. Operating environment

- Conforms to the operating environment of the main unit.

1.3 OT-601

A. Type

Name	Output tray OT-601
Installation	Fixed to the finisher
Mode	Sort, group, and sort stable Sort, group, sort offset, group offset, and sort stable
Number of bins	1 bin
Document alignment	Center

B. Paper type

Mode	Size	Type		Capacity
Sort/group	A6S, A5S/A5, B5S/B5, B6S, A4S/A4, B4, A3, A3Wide 5 1/2 x 8 1/2S/5 1/2 x 8 1/2, 8 1/2 x 11S/8 1/2 x 11, 8 1/2 x 14, 11 x 17 Max. 311.15 mm x 457.2 mm 12.25 x 18 inch Min. 90 mm x 139.7 mm 3.5 x 5.5 inch	Plain Paper	50 to 90 g/m², 13.25 to 24 lb	200 sheets (up to a height of 24 mm)
		Recycled paper		
		Special	Government standard postcards	
			Envelope	
			OHP transparencies	
			Translucent paper	
			Label	
			Letterhead	
		Thick paper 1	91 to 150 g/m² 24.25 to 40 lb	
		Thick paper 2	151 to 209 g/m² 40 to 55.5 lb	
		Thick paper 3	210 to 256 g/m² 55.75 to 68 lb	
Sort offset/ group off-set	A5, B5S/B5, A4S/A4, B4, A3 8 1/2 x 11S/8 1/2 x 11, 8 1/2 x 14, 11 x 17 Max. 297 mm x 431.8 mm 11.75 x 17 inch Min. 182 mm x 148.5 mm 7.25 x 5.75 inch	Plain Paper	50 to 90 g/m², 13.25 to 24 lb	200 sheets (up to a height of 24 mm)
		Recycled paper		
		Thick paper	91 to 256 g/m² 24.25 to 68 lb	
Sort stable		Plain Paper	50 to 90 g/m², 13.25 to 24 lb	200 sheets or 20 copies (up to a height of 24 mm)
		Recycled paper		
		Thick paper	91 to 256 g/m² 24.25 to 68 lb	

C. Machine specifications

Dimensions	282 mm (W) x 368 mm (D) x 57 mm (H) 11 inch (W) x 14.5 inch (D) x 2.25 inch (H)
Weight	0.7 kg (1.5 lb)

D. Operating environment

- Conforms to the operating environment of the main unit.

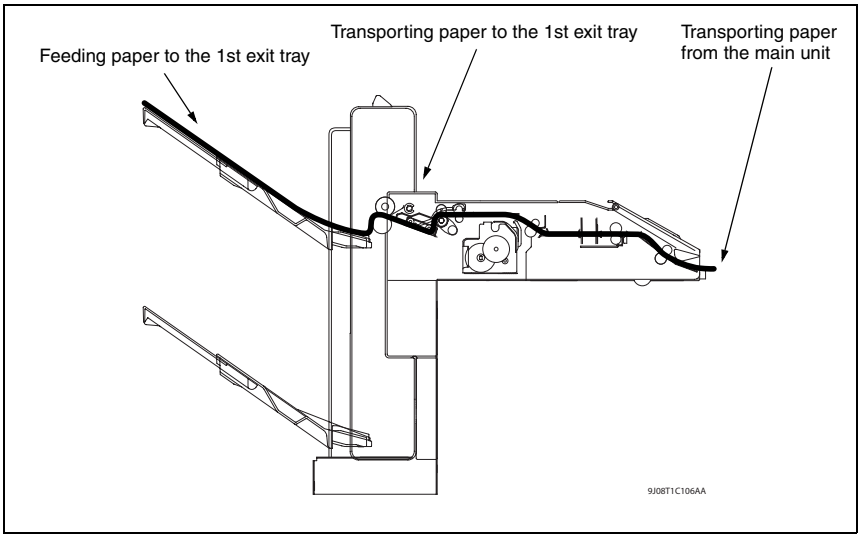
NOTE

How product names appear in the document

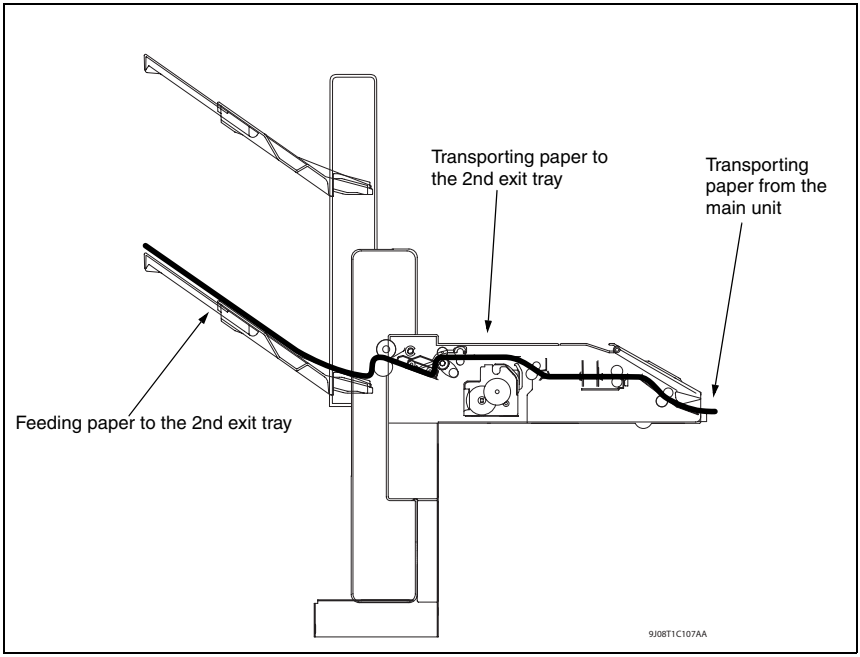
- FS-514: Finisher
- PK-510: Punch kit
- OT-601: Output tray

2. Paper feed path

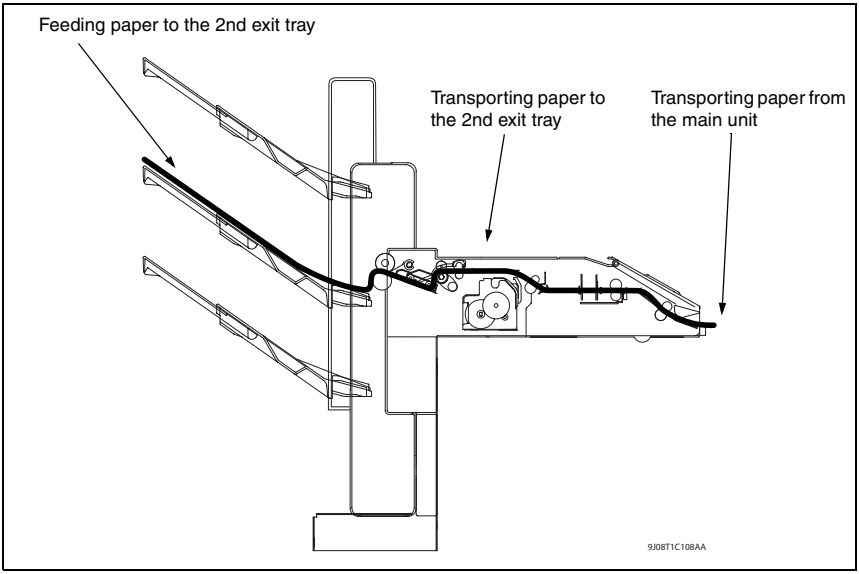
2.1 Feeding paper to the 1st exit tray


Feeding paper to the 1st exit tray
Transporting paper to the 1st exit tray
Transporting paper from the main unit
9J08T1C106AA

2.2 Feeding paper to the 2nd exit tray

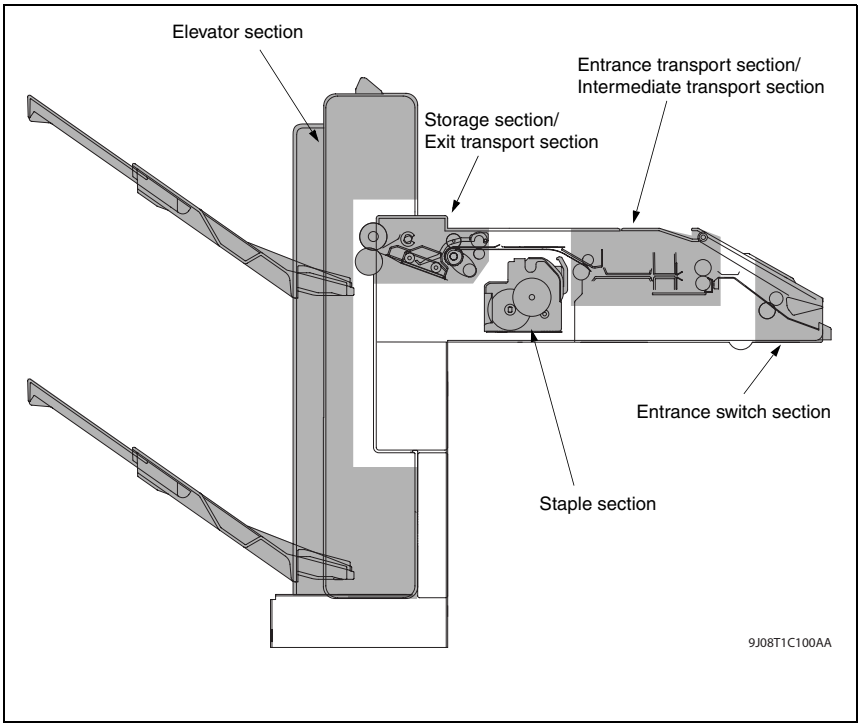

Transporting paper to the 2nd exit tray
Transporting paper from the main unit
Feeding paper to the 2nd exit tray
9J08T1C107AA

2.3 Feeding paper to the 2nd exit tray (When OT-601 is mounted)

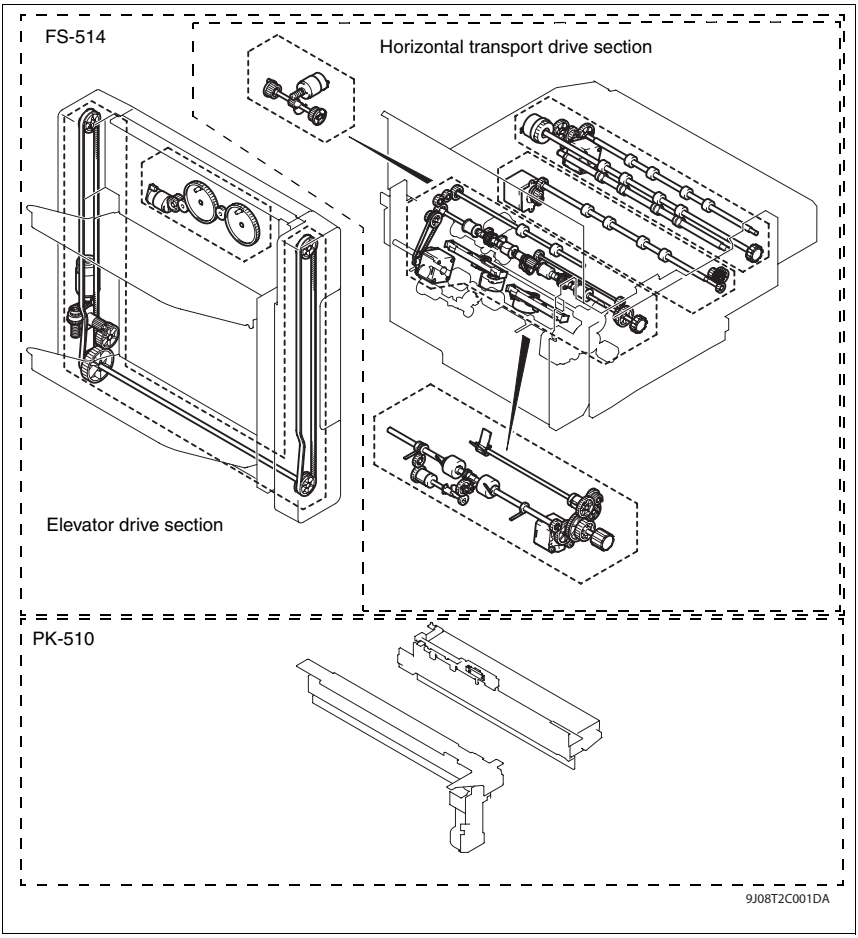

Feeding paper to the 2nd exit tray
Transporting paper to the 2nd exit tray
Transporting paper from the main unit
9J08T1C108AA

Composition/Operation

3. Composition



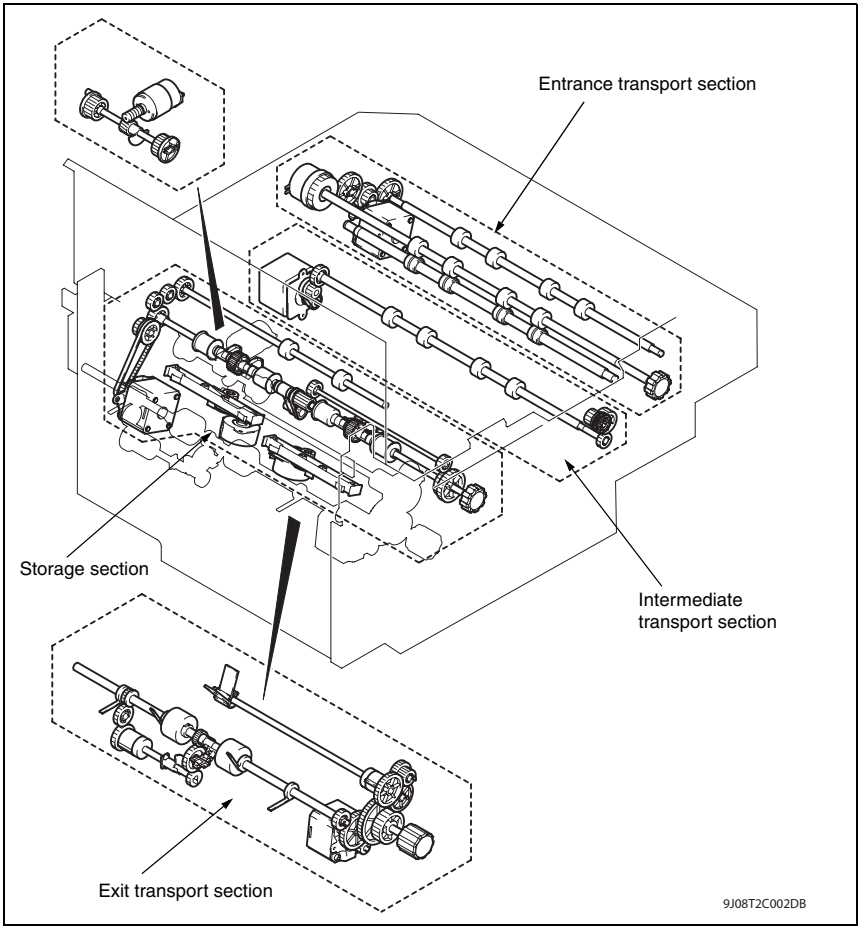
4. Drive


FS-514
Horizontal transport drive section
Elevator drive section
PK-510
9J08T2C001DA

5. Operations

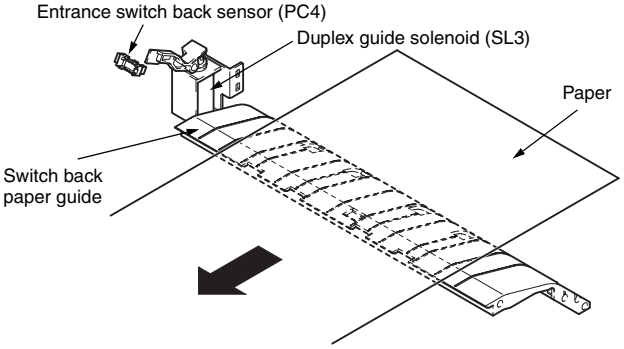
5.1 Transport section

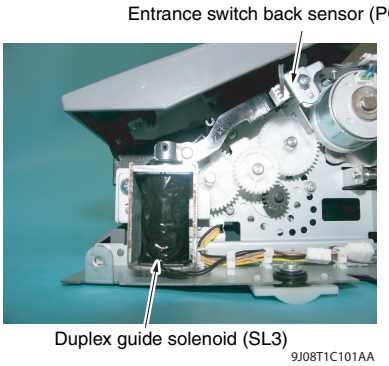
- The transport section is divided into the entrance transport section, intermediate transport section, storage section, and the exit transport section. It controls to transport the paper fed from the main unit, stop the paper at the punching and creasing positions, and drive the paper for feeding into the exit section.



5.1.1 Entrance switch section

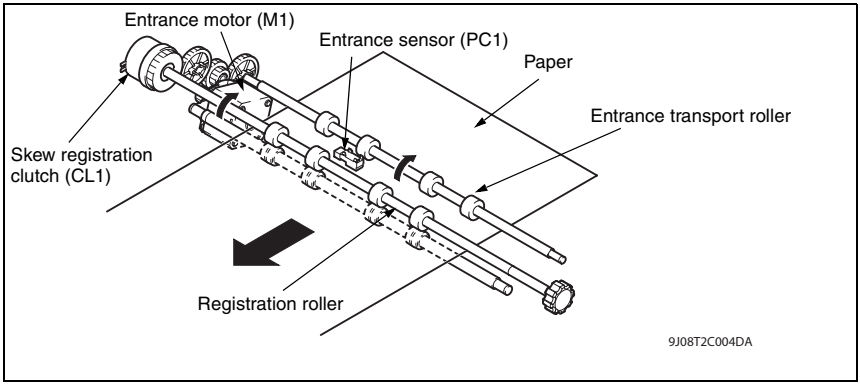
- One-sided printing paper and the two sided printing paper for printing the second side which are loaded from the copier will be loaded to the intermediate transport section. (forward entrance)
- Two-sided printing paper for printing the first side will not be loaded to the intermediate transport section, but will switch back to the copier. In order to do this, the duplex guide solenoid will switch the entrance, and transport the paper temporarily to the switch back entrance. The feeding direction of the paper will be changed to return the paper to the copier. (switch back entrance)
- Paper will be transported by the switchback motor drive installed to the duplex unit.
- When the duplex guide solenoid turns ON, the switch back paper guide will be pushed up and the entrance will be switched to the switch back entrance.
- Switch back entrance will be detected by the entrance switch back sensor.
- The entrance will be switched to the forward entrance when a paper jam, a trouble, or setting error occurs.





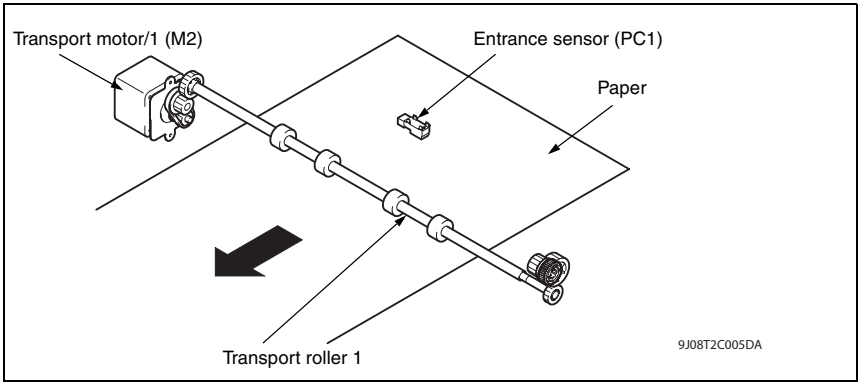
5.1.2 Entrance/transport section

- The paper fed from the main unit is transported to the intermediate transport section.
- The entrance motor provides the drive for transporting the paper.
- When the entrance motor is energized, the entrance transport roller is driven to rotate.
- When the skew registration clutch is energized, the registration roller is driven to rotate.
- The entrance sensor detects the paper in the transport section.



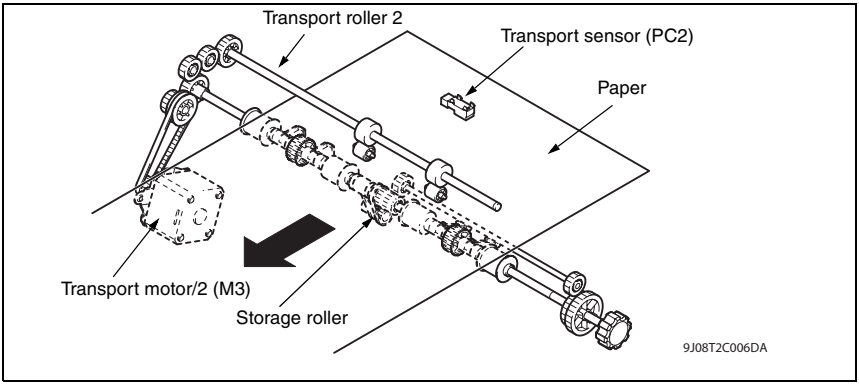
5.1.3 Intermediate transport section

- The paper transported from the entrance transport section is brought to a stop at the punching and creasing position. The paper is also transported to the storage section.
- Drive for the intermediate transport section is provided by the transport motor/1. Drive of the transport roller 1 is controlled.
- The entrance sensor detects paper in the intermediate transport section.



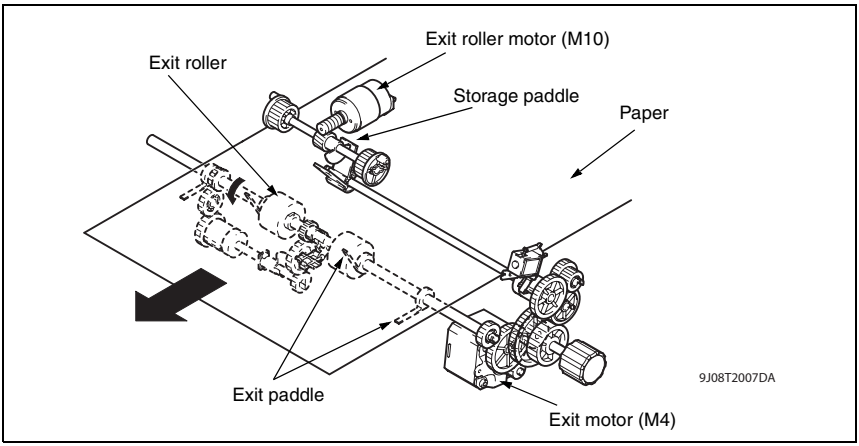
5.1.4 Storage section

- The paper transported from the intermediate transport section is transported to the storage section.
- Drive for the storage section is provided by the transport motor/2. Drive of the transport roller 2 and storage roller are controlled.
- The entrance sensor and transport sensor detects paper in the storage section.



5.1.5 Exit transport section

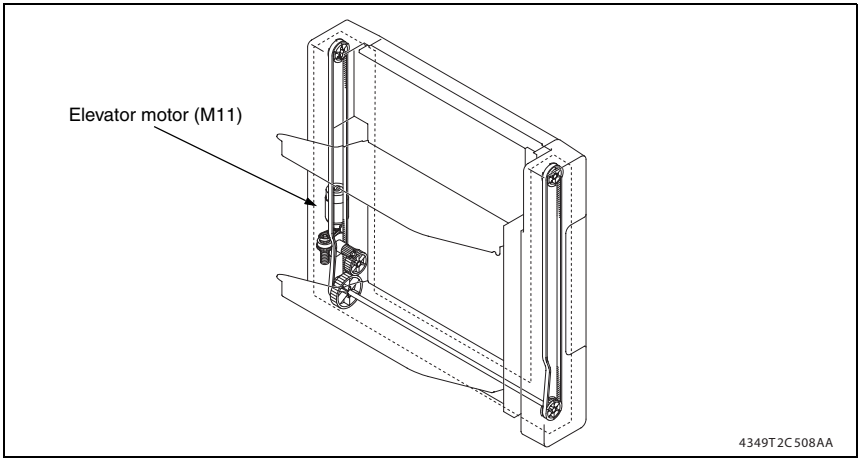
- The paper transported from the storage section is transported onto each of the exit trays.
- The exit motor provides drive for the exit roller, storage paddle, and exit paddle.



5.2 Elevator section

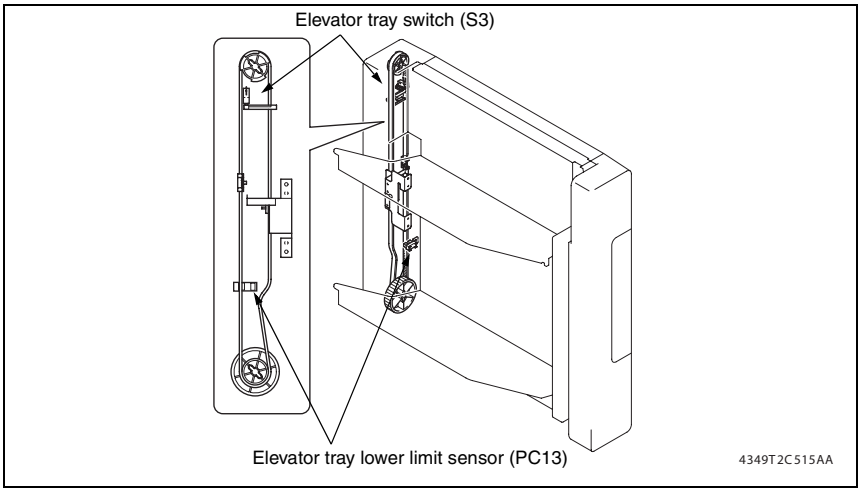
5.2.1 Elevator mechanism

- The elevator mechanism is operated to select a specific exit port, thereby feeding the paper out onto a specific exit tray.



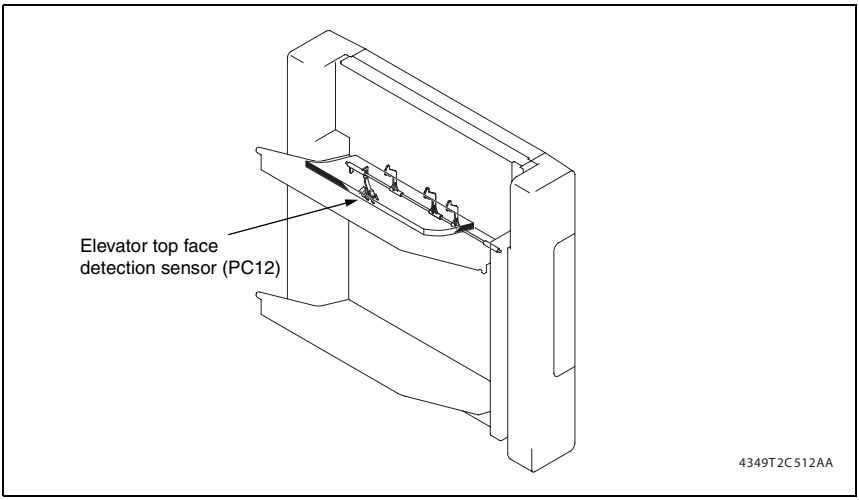
5.2.2 Elevator tray ascent/descent

- The elevator tray is moved up or down by the elevator motor that turns forward or backward to drive the front and rear belts.
- The elevator tray lower limit sensor detects the elevator tray at its lower limit position.
- Elevator tray switch is mounted for preventing the elevator tray's overrun for both upper and lower parts.
- The shutter is mounted for preventing the hand from being caught at the exit when the tray moves up and down.
- The shutter detect switch is mounted for preventing the hand from being caught when the shutter opens or closes.



5.2.3 Tray position detection mechanism

- The tray moves up or down according to the amount of paper fed onto it.
- If the elevator top face detection sensor is activated when a sheet of paper is fed onto the tray, the elevator tray is temporarily lowered until the elevator top face detection sensor is deactivated and then the tray is raised to a level, at which the elevator tray.
- Elevator top face detection sensor is activated again. This is done when each time a sheet of paper is fed onto the tray to keep the same height at all times for the elevator top face detection sensor of the paper on the tray.

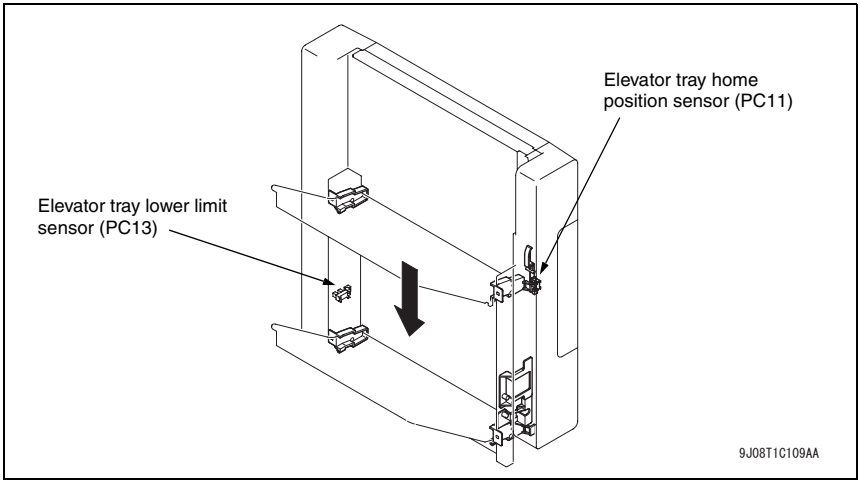


A. Tray position detection

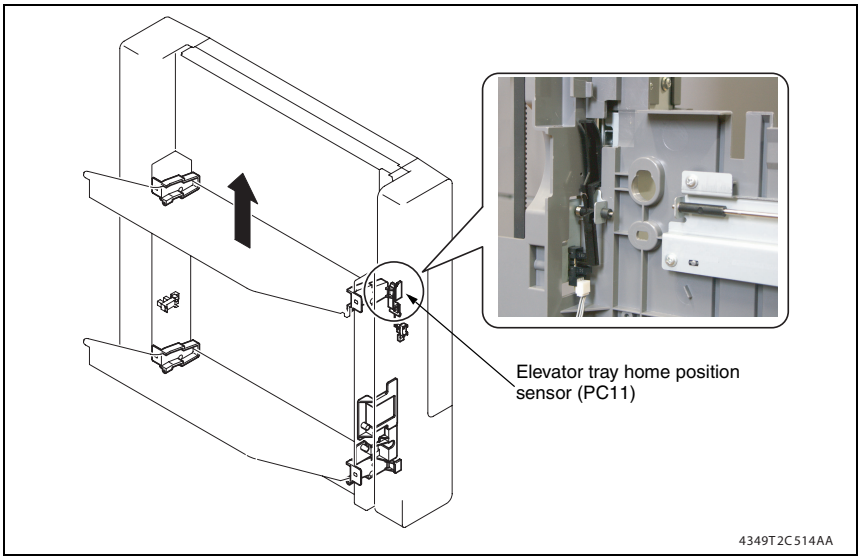
- Tray position detection is controlled according to the number of times the elevator tray home position sensor is activated after the elevator tray lower limit sensor has been activated.

(1) Tray position detection operation

1. During the initial operation sequence, the elevator tray is subjected to a descent motion until the elevator tray lower limit sensor is activated.



2. After the elevator tray lower limit sensor has been activated, the elevator tray is subjected to an ascent motion.
3. When the elevator tray home position sensor is activated a first time after the ascent motion of the elevator tray has been started, it is determined that the elevator tray is now located at the exit port for the 1st exit tray.



4. When the elevator tray home position sensor is activated a second time after the ascent motion of the elevator tray has been started, it is determined that the elevator tray is now located at the exit port for the 2nd exit tray.
5. Drive is stopped when the elevator top face detection sensor is activated with the home position sensor of the target tray in the activated position.

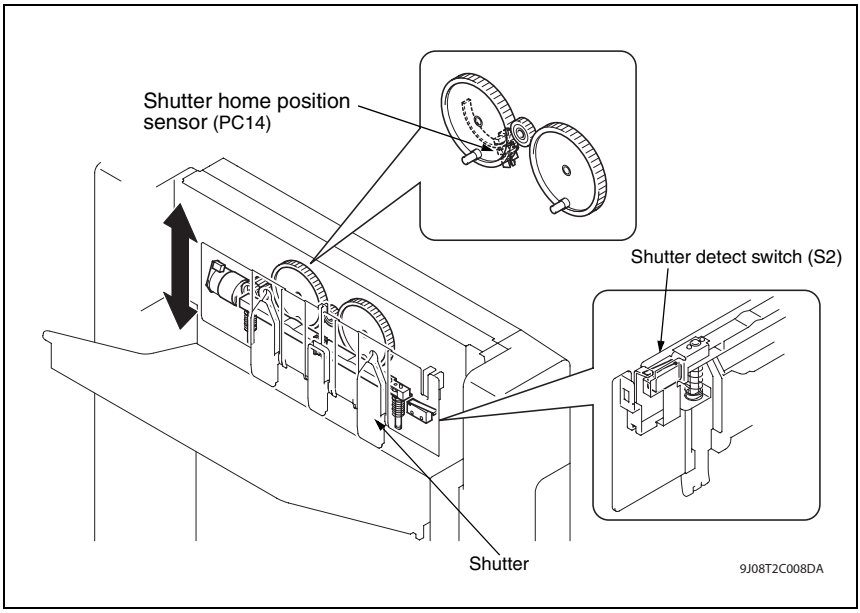
* If an additional OT-601 tray is installed, the additional tray is at the exit port when the position sensor is activated twice and the 2nd tray is at the exit port when the home position sensor is activated three times.

B. Paper full detection

- When the elevator tray home position sensor changes from the activated to deactivated state with the elevator top face detection sensor in the activated state, a paper full condition is detected and the corresponding message will appear on the control panel.
- The shutter is closed to cover the exit while the elevator tray is moving.
- The elevator motor provides the drive for the elevator tray.
- The shutter motor opens or closes the exit port.

5.2.4 Shutter open/close mechanism

- The shutter at the exit is open with the opening for exit being disclosed. When the tray moves, the shutter closes to prevent the hand from being caught at the exit.
- The shutter is opened or closed by the shutter motor that turns a gear train for raising or lowering the shutter.
- The shutter home position sensor detects the position of the gear, thereby determining the position of the shutter.
- The shutter detection switch is mounted to prevent the hand from being caught when the shutter opens and closes. Pressing the shutter detection switch will stop the shutter's opening or closing operation as well as tray's up or down movement.



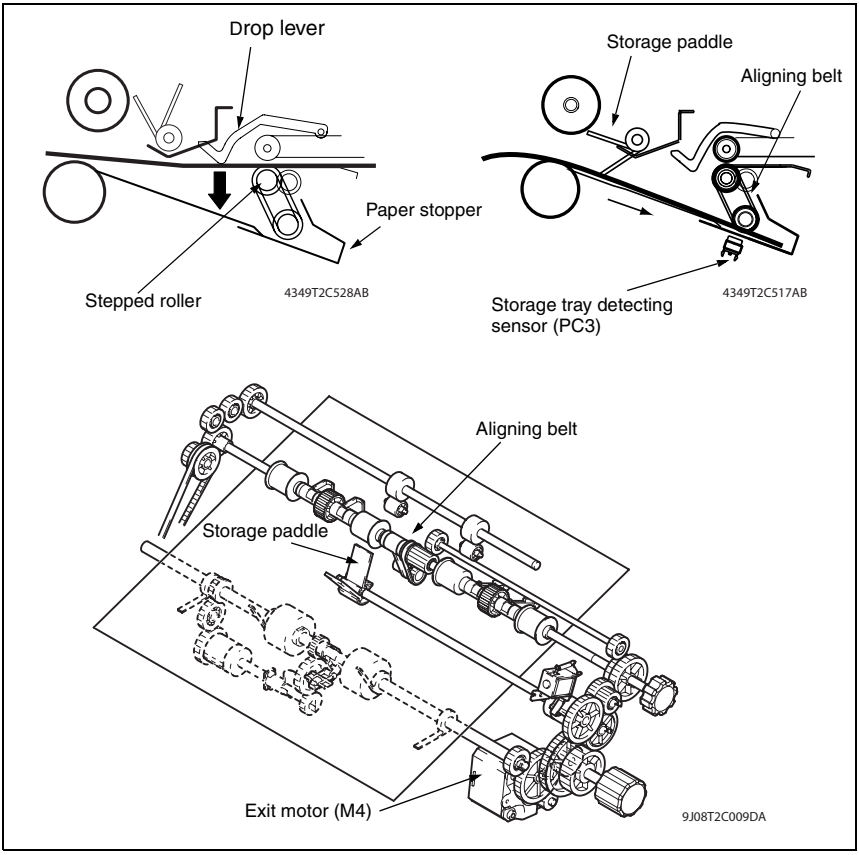
5.3 Paper aligning section

5.3.1 Paper aligning mechanism (sub scan direction)

- Sheets of paper are aligned properly and stapled together inside the transport section before being fed out onto the corresponding exit tray.
- In the sort, group copy, staple, or center crease/center staple mode, each copy set is stored in the storage tray with the upper exit roller separated from the lower exit roller.
- The storage tray detect sensor detects paper in the storage tray.
- The storage paddle and aligning belt are driven when the exit motor is rotated in reverse.

A. Operation

1. The paper fed out from the main unit is held downward by the drop lever and dropped down into the storage tray by the stepped roller.
2. The paper dropped into the storage tray is pressed against the stopper by the paddle and aligning belt so that it is aligned properly in the sub scan direction.

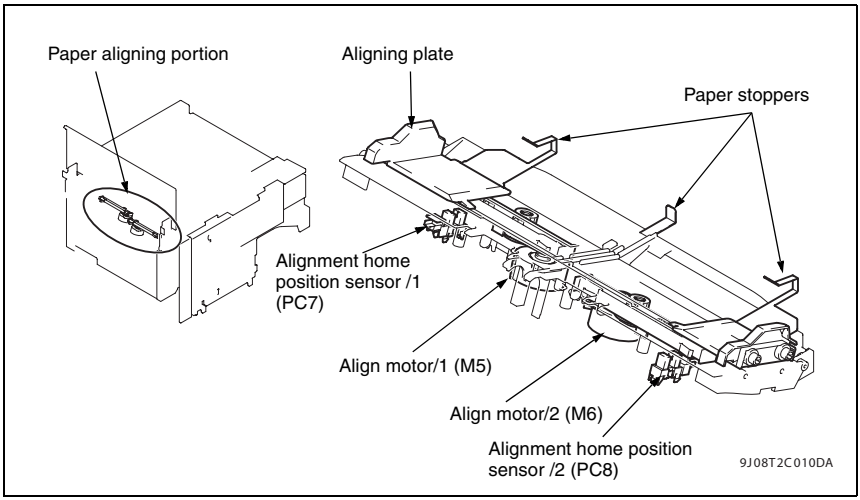


5.3.2 Paper aligning mechanism (main scan direction)

- Aligning plates are moved and the paddle is rotated so as to align the paper at the stapling position.
- The paper in the storage tray is aligned in the main scan direction by two align motors and aligning plates.

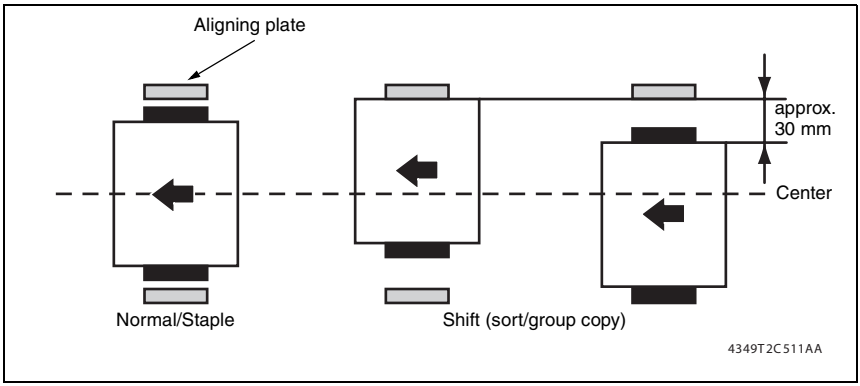
A. Aligning plates

- The aligning plates are moved to the front or rear in accordance with the paper size.
- The alignment home position sensor controls the position of each aligning plate.



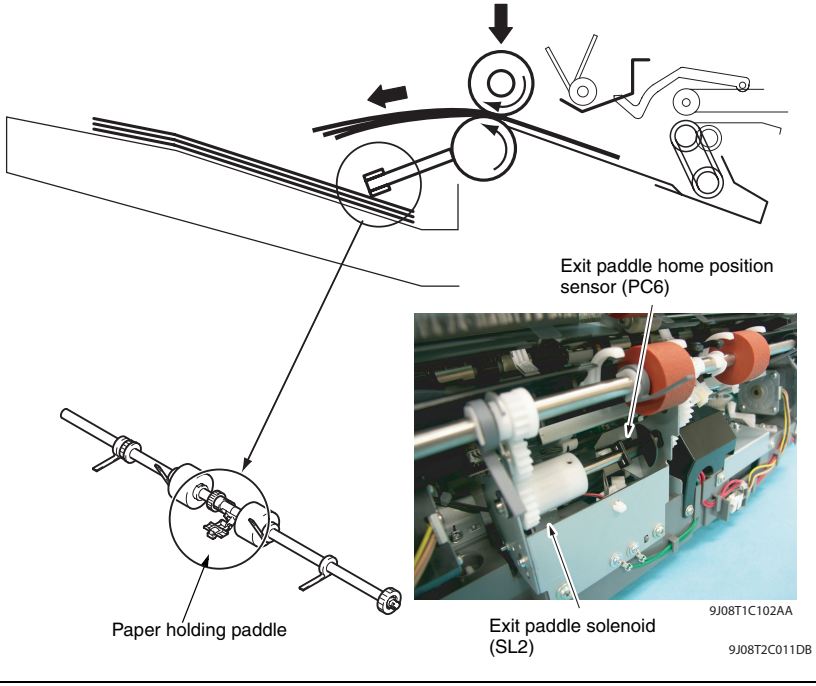
B. Paper aligning sequence

- In normal print and staple mode, the paper is fed into the tray at its center position.
- If no stapling is involved in the sort or group copy mode, the aligning plate shifts 15 mm to the front or rear from the center. This stacks copy sets/stacks in a saw tooth manner, each being offset by about 30 mm with respect to the others.
  This shifting motion is not performed when sets/stacks are fed into the mail bins or the saddle unit.



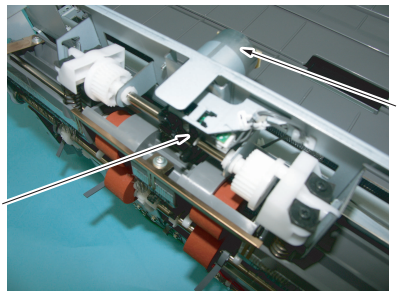
5.3.3 Exit mechanism

- There is a paper holding paddle provided at the exit roller for preventing the copy set/stack on the exit tray from being pushed by a new copy set/stack that is being fed out (Except the staple mode).
- The subsequent copy set/stack is fed out with the copy sets/stacks previously resident on the tray being held down by the paper holding paddle.
- The exit paddle home position sensor, spring clutch, and exit paddle solenoid control the retracted position and paper holding position of the paper holding paddle.



A. Upper exit roller up/down motion mechanism

- The exit roller motor moves the upper exit roller away from the lower exit roller or presses the upper exit roller up against the lower exit roller.
- When one copy set/stack is stored in the storage tray, the upper exit roller is moved downward to be pressed up against the lower exit roller and the two rollers feed the copy set/stack out onto the exit tray.
- The exit roller home position sensor detects the position of the upper exit roller, whether it is in the raised or lowered position.)



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△2

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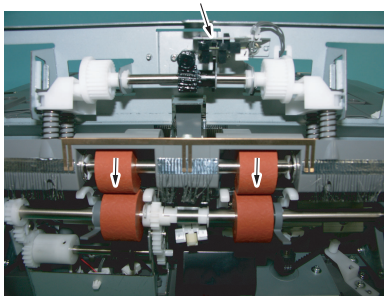

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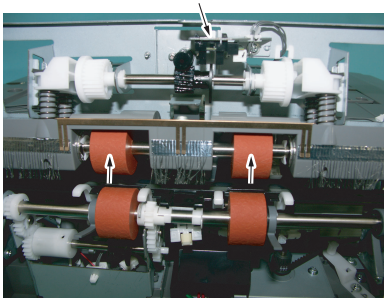
Unblocked (Separated)



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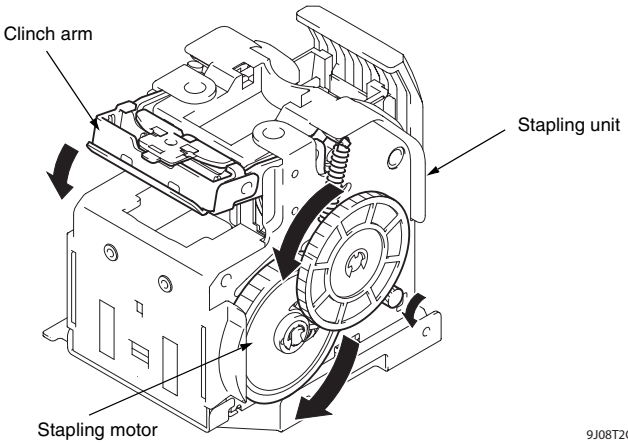
5.4 Staple section

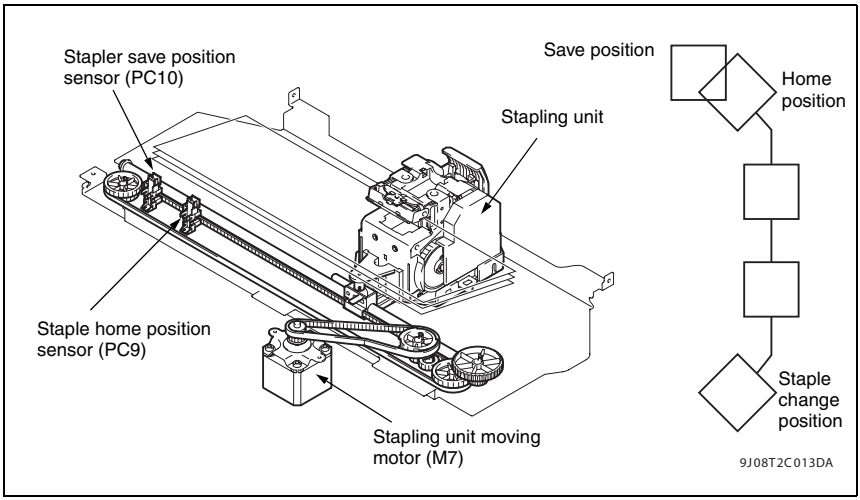
5.4.1 Stapling mechanism

- Stapling is performed by the stapling unit.
- When the stapling motor is rotated, the clinch arm lowers. The stapler thereafter goes up to drive a staple in the paper.
- Five different types of stapling are available: parallel front one point, parallel rear one point, slant front one point, slant rear one point and parallel two points.



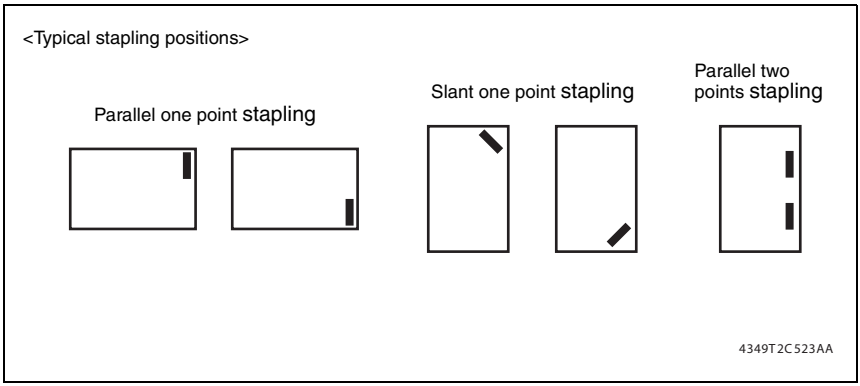
5.4.2 Stapling unit moving mechanism

- The stapling unit is moved by the stapling unit moving motor.
- The stapling unit moving motor drives the belt so that the stapling unit is moved to the corresponding stapling position.
- The stapling stop position is controlled by the period of time during which the stapling unit moving motor is kept energized, as counted from the time when the staple home position sensor has been activated.
- The stapler unit will move to the stapler save position during the saddle mode. (The stapler unit needs to be in the save since the moving part of the holding section shifts from horizontal to 20 degrees angles during the saddle mode.)
- The stapler save position is detected by the stapler save position sensor.



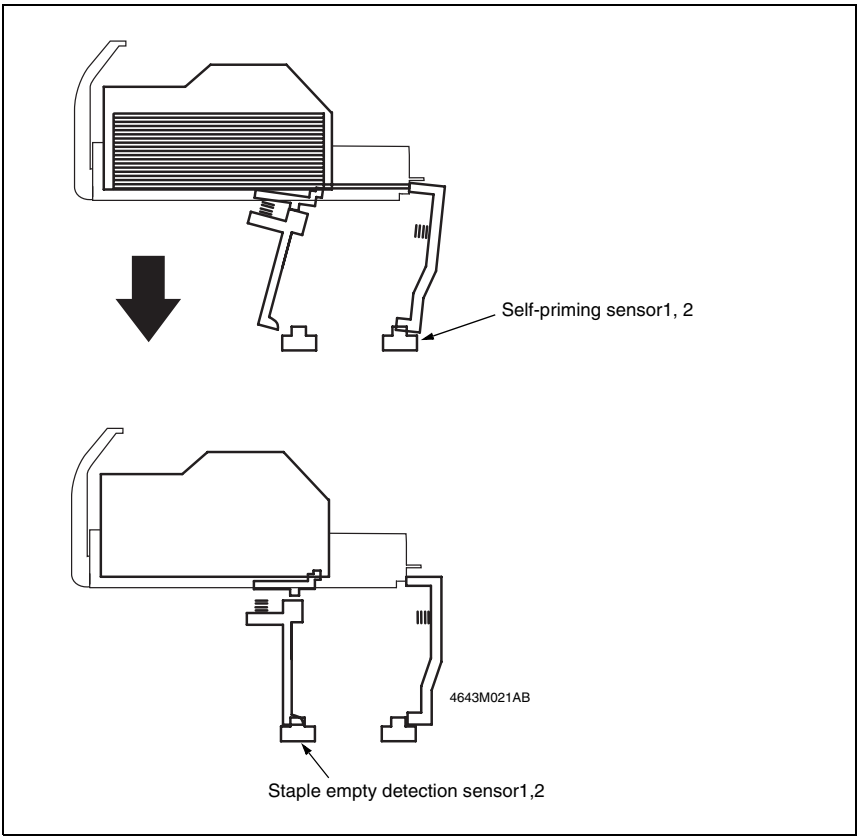
5.4.3 Stapling position

- A single stapling unit is moved to perform 2-point stapling.



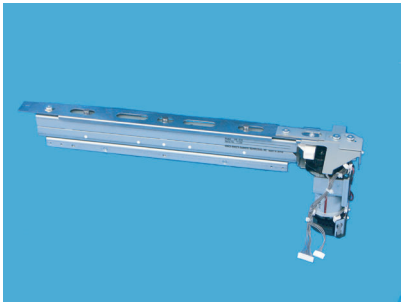
5.4.4 Staple sheet empty detection

- Staple empty detection sensor 1, 2 detect whether or not there is a staple sheet still left.
- When the number of staples left in the staple cartridge becomes about 20, a staple sheet empty condition results, causing a corresponding empty message to appear on the control panel.
- When the empty condition is detected, the corresponding empty indication is given on the control panel. At the same time, the Stapling Unit moves to the front.
- When a new staple cartridge is loaded, the stapling motor is energized until the self-priming sensor detects a staple, which results in the staple to be fed up to the stapling position.



6. Punch kit (PK-510)

6.1 Composition



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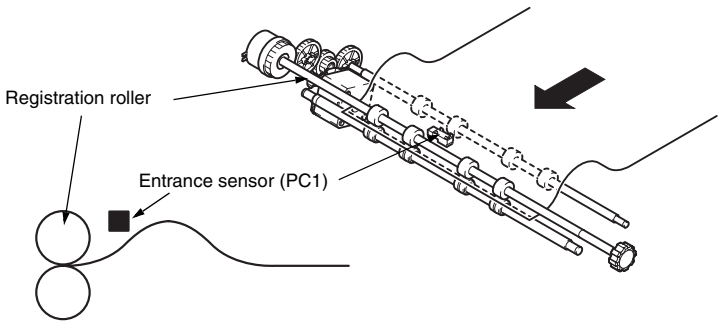
6.2 Operation

6.2.1 Skew correction mechanism

- For punch and center crease operations, a loop is formed in the paper at the registration roller to correct skew.
- The entrance sensor detects the leading edge of the paper and the registration roller forms a loop in the paper.
- The skew registration clutch is then energized after a given period of time after the entrance sensor is activated by the leading edge of the paper, this causes the registration roller to start turning.



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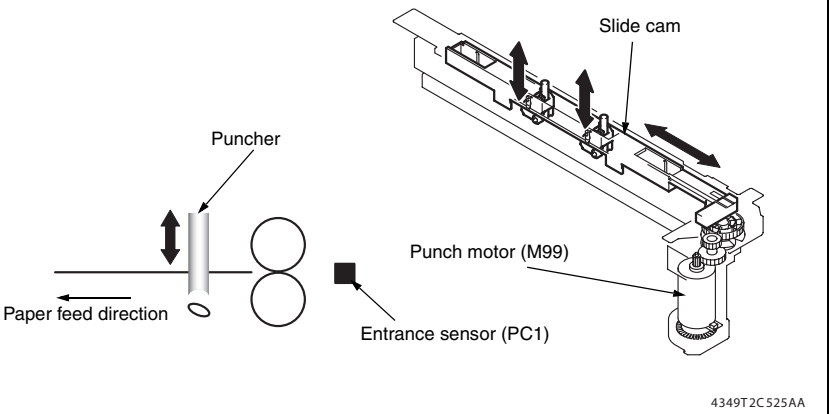
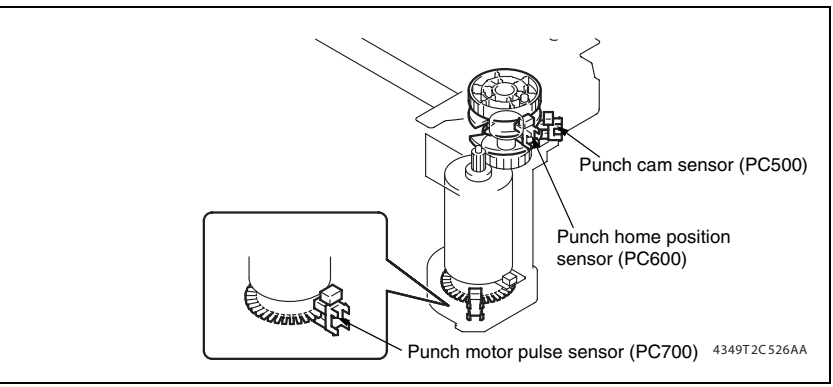
6.2.2 Punch mechanism

- The entrance sensor will detect the back edge of the paper, and stop feeding the paper at the specified time. The puncher will move down to make the punch hole at the back edge of the paper. (The punch hole will be made sheet by sheet.)
- The drive cam will be rotated by the punch motor inside the punch unit to move the slide cam back and forth. The slide cam will move the puncher down to make the punch holes.



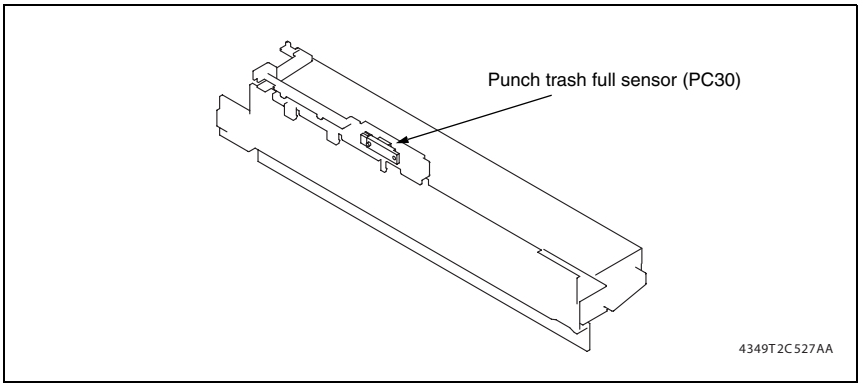
6.2.3 Punch status detection

- The punch status is detected by using the punch cam sensor, punch home position sensor, and the punch motor pulse sensor.



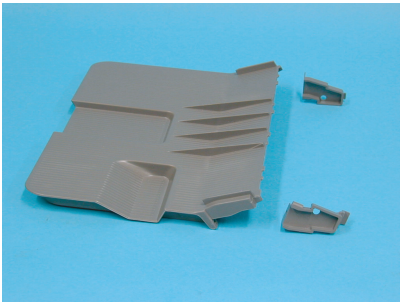
6.2.4 Punch trash box full detection mechanism

- Punch trash produced as a result of punching operation is stored in the punch trash box.
- The punch trash box is provided with the punch trash full sensor. When a punch waste is detected, the corresponding message is displayed on the control panel.
- The punch trash full sensor is a reflector type sensor that detects height of the punch trash.
- Punch trash full sensor also detects whether or not the punch dust box is mounted. “Punch dust full” message will be displayed on the control panel when the punch trash box is not mounted.



7. Output tray (OT-601)

7.1 Composition



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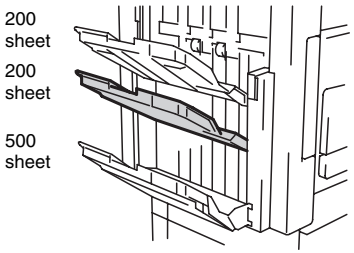
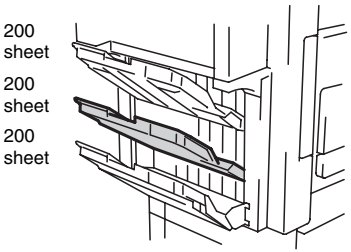
7.2 Operation

7.2.1 Overview

- Mounting the optional output tray (OT-601) provides a total of three exit trays.
- The output tray is attached at different positions depending on whether options SD-503/MT-501 are mounted or not.
  The capacity of each of the different trays depends on the specific positions they are attached.
- When the short-circuit connector shipped with the output tray is mounted, the machine determines that the output tray has been mounted.



FS-514 Only



When MT-501/SD-503 is Installed

4349T2C530AA

KONICA MINOLTA

SERVICE MANUAL

THEORY OF OPERATION

MT-501

2006.08

KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

Revision history

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2006/08	1.0	—	Issue of the first edition
Date	Service manual Ver.	Revision mark	Descriptions of revision

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5.2 Paper path selection mechanism 6
5.3 Paper detection 7

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Outline

1. Product specification

A. Type

Name	Mailbin kit	
Installation	Install at the top section of the finisher elevator tray.	
Number of bins	4 bins	
Number of sheets stored per bin	125 sheets (90 g/m^2, 24 lb)	
Storable paper	Plain paper	50 to 90 g/m^2 (13.25 to 24 lb)
	Recycled paper	
Storable paper size	Metric area	A5S, B5, A4
	Inch area	5 $^1/_2$ x 8 $^1/_2$S, 8 $^1/_2$ x 11

B. Machine specifications

Power requirements	DC 24 V (Supplied from the finisher) DC 5 V (Generated inside the mail bin)
Dimensions	340 mm (W) × 509 mm (D) × 387 mm (H) 13.5 inch (W) × 20 inch (D) × 15.25 inch (H)
Weight	8 kg (17.75 lb)

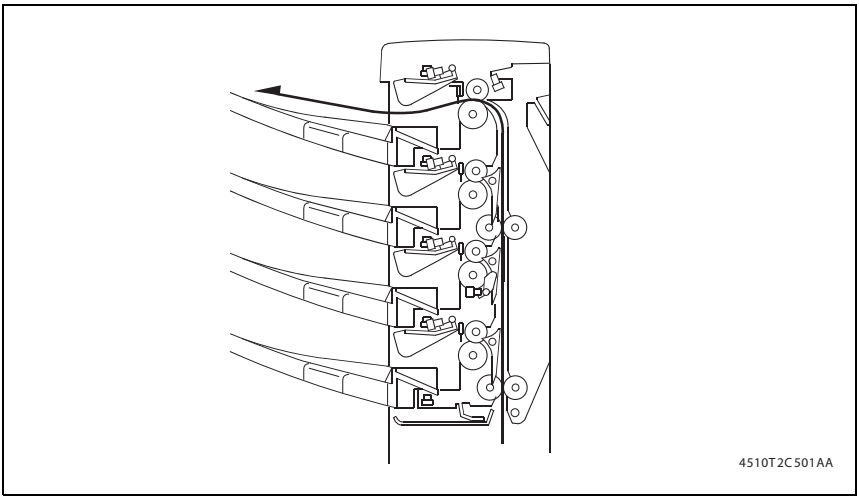
C. Operating environment

- Conforms to the operating environment of the main unit.

NOTE

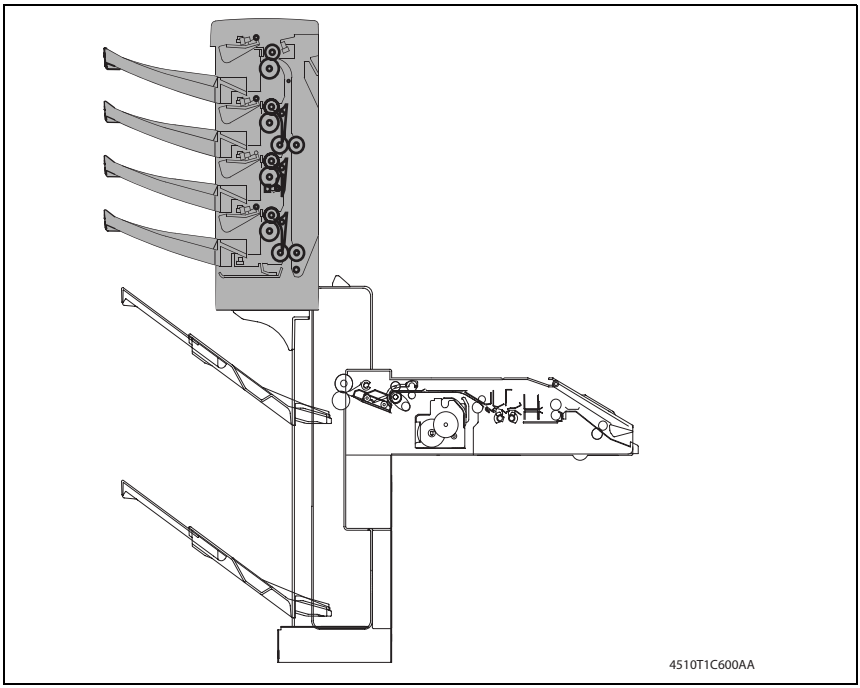
- **These specifications are subject to change without notice.**

2. Paper path

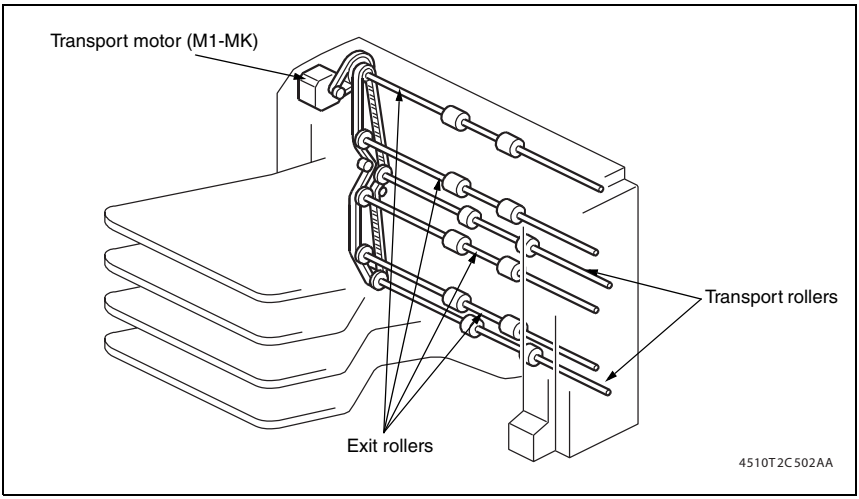


Composition/Operation

3. Composition



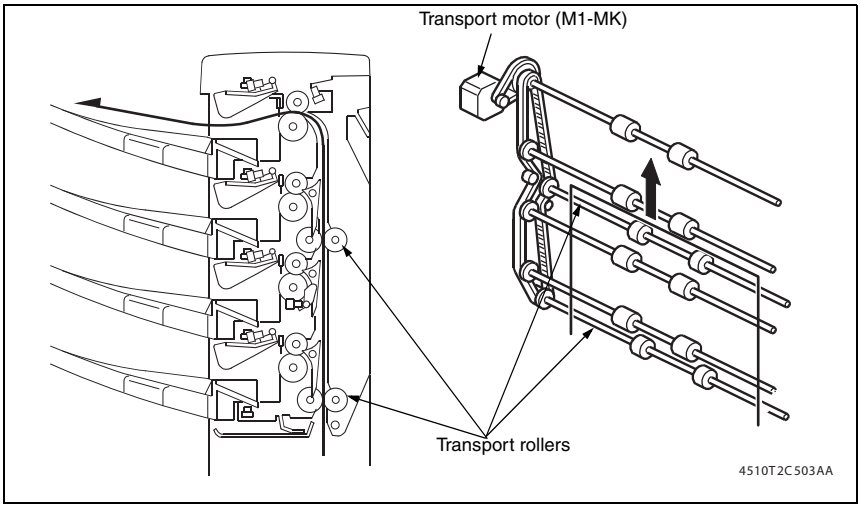
4. Drive


Transport motor (M1-MK)
Transport rollers
Exit rollers
4510T2C502AA

5. Operations

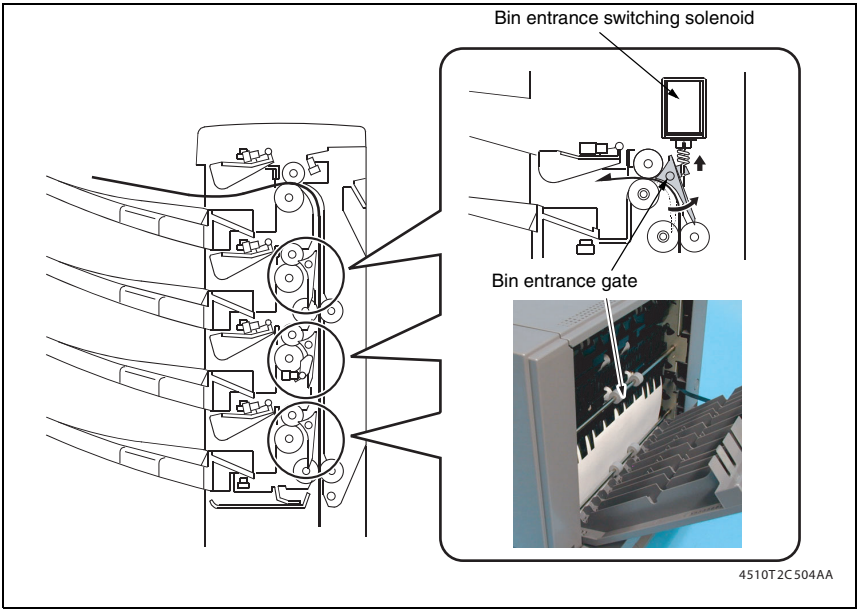
5.1 Paper transport mechanism

- When the mailbin is selected as the exit source, paper is fed off from the finisher (FS-514) and toward the mailbin.
- Drive for the transport rollers of the mailbin is transmitted from the transport motor by way of a belt.
- As each of the transport rollers is driven, paper fed off from the finisher is transported into the mailbin.



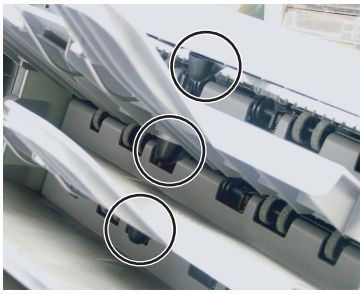
5.2 Paper path selection mechanism

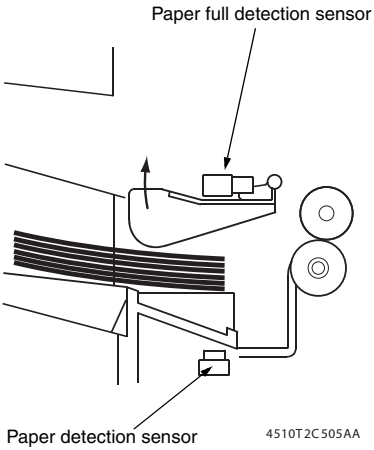
- The bin entrance switching solenoids are energized or deenergized to direct paper fed from the finisher into a specific tray.
- There are three bin entrance switching solenoids provided that will be energized or deenergized to operate the corresponding bin entrance gate, thereby selecting a specific paper path into a specific tray.



5.3 Paper detection

- The paper detection sensor detects any sheet of paper that is fed into the tray, causing the ADF LED to light up green steadily to inform the user that a sheet of paper has been fed into the tray.
- As the paper stacks up and eventually deactivates the paper full detecting sensor, at which time a paper full condition is detected.





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KONICA MINOLTA

SERVICE MANUAL

THEORY OF OPERATION

SD-503

2006.08

KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

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5.6.1 In & out guide mechanism 12
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Outline

1. Product specification

A. Type

Name	Saddle sticher SD-503
Type	Built into the finisher
Installation	Screwed to the finisher
Document alignment	Center
Stapling function	Center parallel two points No. of sheets to be stapled together: 2 to 15

B. Paper type

Type	Plain paper	50 g/m^2 to 90 g/m^2 13.25 to 24 lb
	Recycled paper	
Size	B5S to A3 8 $^1/_2$ x 11S to 11 x 17	
Capacity	200 sheets or 20 copies	

C. Machine specifications

Power requirements		DC 24 V (supplied from the finisher) DC 5 V
Max. power consumption		9.5 W or less
Dimensions	Crease unit	48 mm (W) x 399 mm (D) x 121 mm (H) 2 inch (W) x 15.75 inch (D) x 4.75 inch (H)
	Saddle unit	445 mm (W) x 478 mm (D) x 203 mm (H) 17.5 inch (W) x 18.75 inch (D) x 8 inch (H) 576 mm (W) x 478 mm (D) x 281 mm (H) *1 22.75 inch (W) x 18.75 inch (D) x 11 inch (H) *1
Weight	Crease unit	1.9 kg (0.5 lb)
	Saddle unit	7.4 kg (2.0 lb)

*1: Size when the paper output tray is pulled out

D. Operating environment

- Conforms to the operating environment of the main unit.

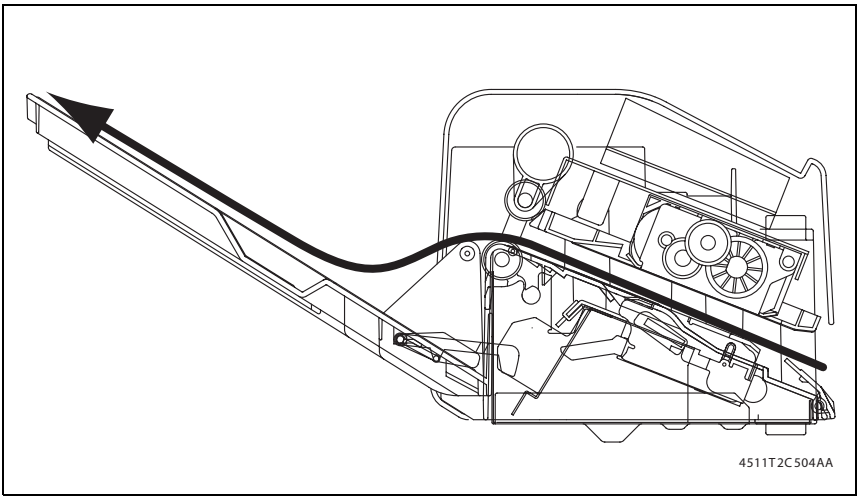
E. Consumables

- Staples 2000 (MS-2C) x 2

NOTE

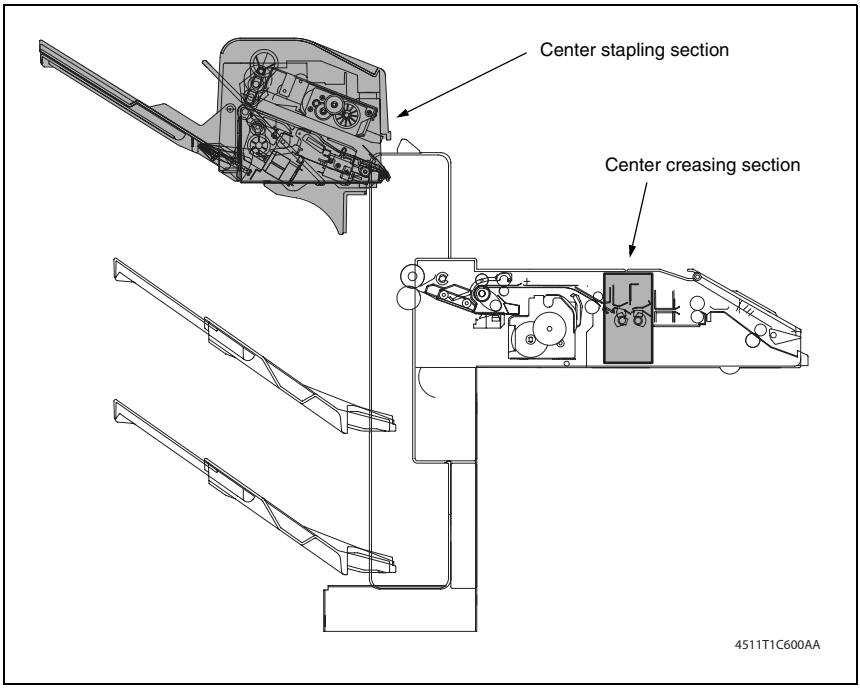
- **These specifications are subject to change without notice.**

2. Paper path



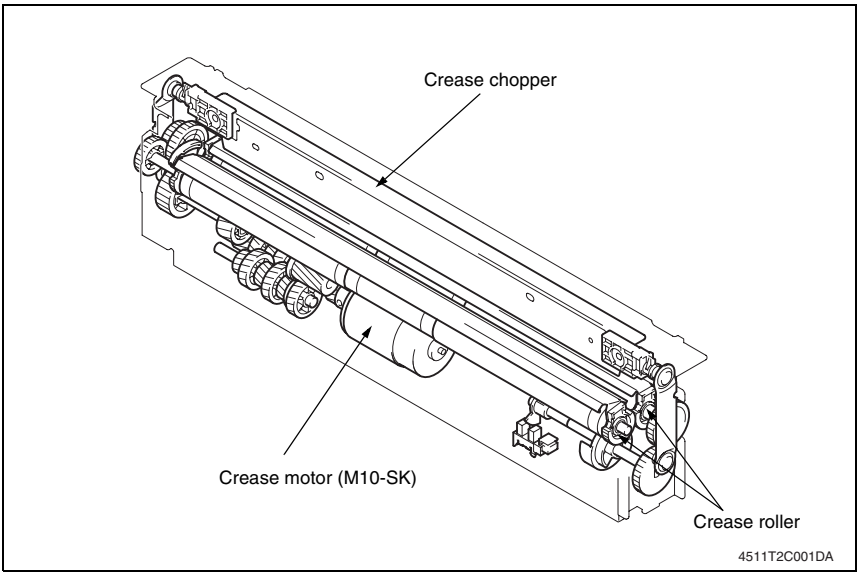
Composition/Operation

3. Composition

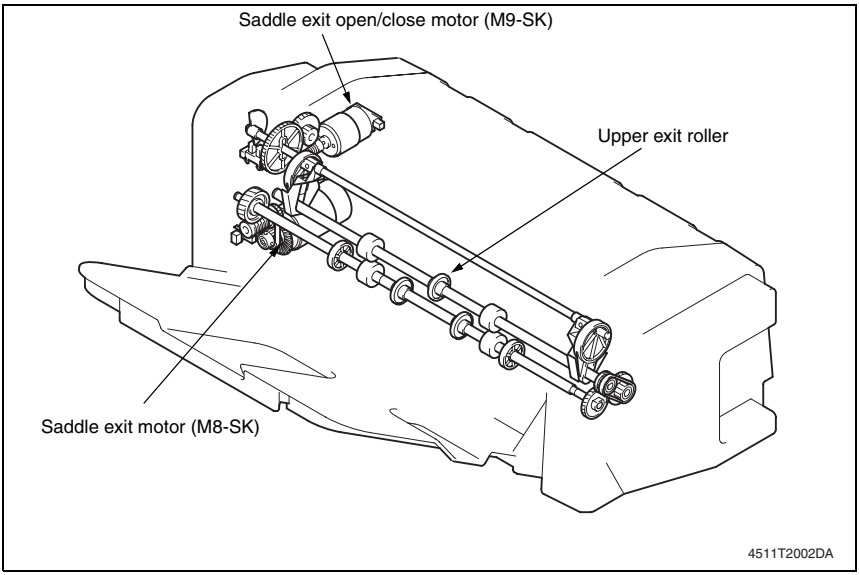


4. Drive

4.1 Center creasing section



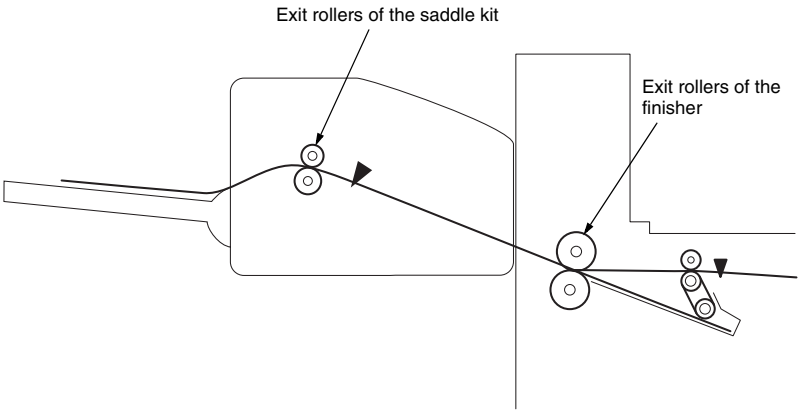
4.2 Center stapling section



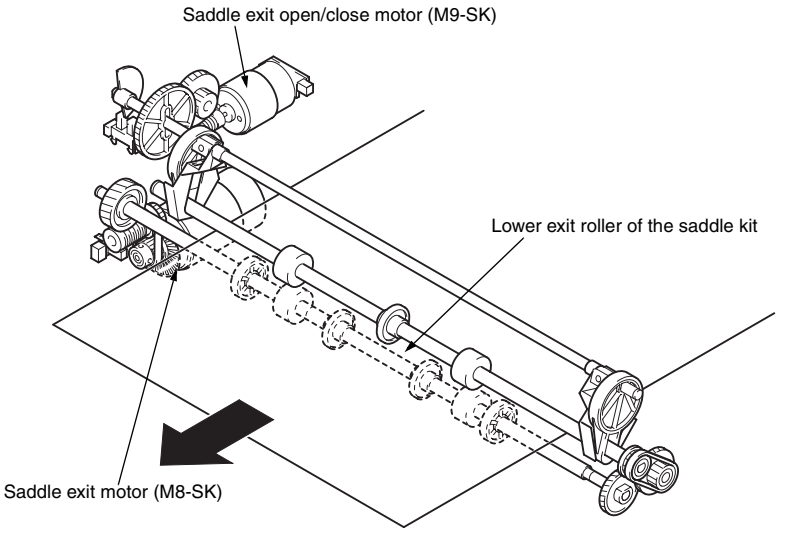
5. Operations

5.1 Paper transport mechanism

- Paper is transported by the exit rollers of the finisher and exit rollers of the saddle kit.
- The saddle exit motor provides the drive for the exit rollers of the saddle kit.
- If a center stapling operation is made with a copy set/stack (that has been creased at the center or is to be stapled at the center) stored in the storage tray, the copy set/stack is transported to the center stapling position, through a pulse control of the exit roller of the finisher.
- The copy set/stack is thereafter fed out by the exit rollers of the saddle kit.



4511T2C502AA

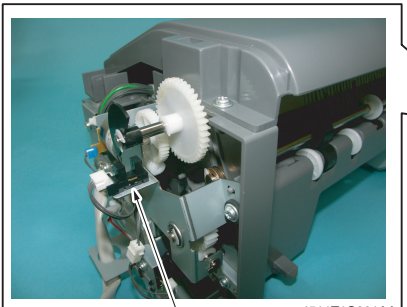


4511T2C003DA

5.2 Exit roller pressure/release

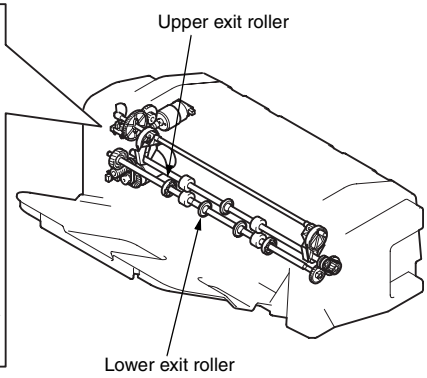
5.2.1 Pressure/release mechanism

- The upper exit roller is moved away from, or pressed up against, the lower exit roller, when the paper is fed out as a copy set/stack.
- The saddle exit roller home position sensor is used to control the pressure/release position of the upper exit roller.



4511T1C601AA

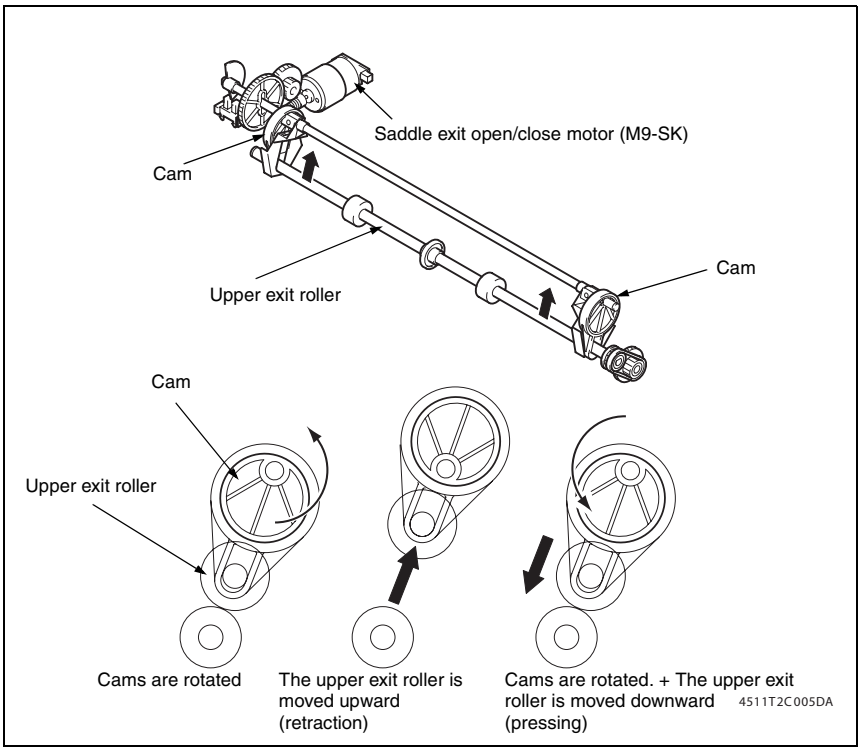
Saddle exit roller home position sensor (PC18-SK)



4511T2C004DA

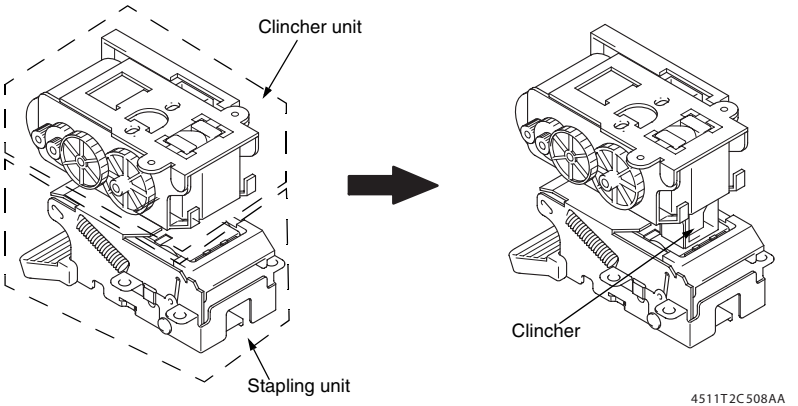
5.2.2 Operation

1. The upper exit roller is moved up or down by the cams which are driven by the saddle exit open/close motor.
2. When the copy set/stack moves past the exit roller, the motor is energized to press the upper exit roller up against the lower exit roller, thereby feeding the copy set/stack out into the tray.



5.3 Stapling mechanism

- There are two the stapling units in the saddle kit, each being fixed to a specific position.
- Since the unit is for center stapling only, it is made up of the upper clincher portion and the lower stapling portion. The copy set/stack moves through the space between the upper and lower portions of the staplers.
- When stapling, the clincher portion moves downward to perform the stapling operation.

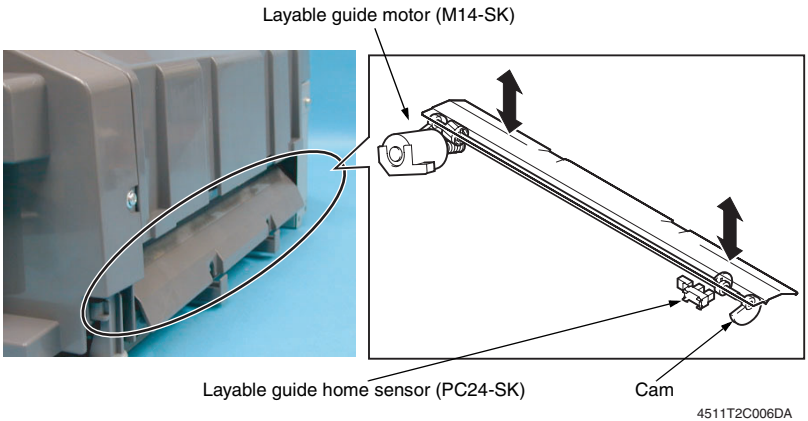


5.4 Layable guide

- The movable guide is used to guide the leading edge of the first sheet of paper when the first sheet of paper is stored, thereby preventing the leading edge from contacting the stapling unit and curving.

5.4.1 Layable guide mechanism

- The layable guide motor turns the cams at the front and rear, thereby moving the layable guide up or down.
- The layable guide home sensor detects the position of the layable guide motor.

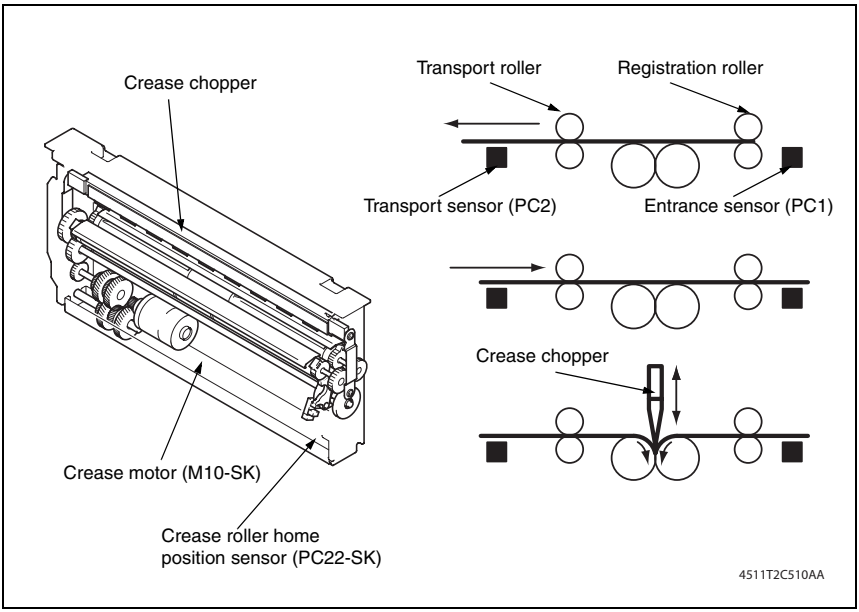


5.4.2 Operation timing

1. Raising the movable guide
   (power ON, sleep cancelled, error reset, paper removed from tray)
2. Lowering the movable guide
   (When the transport of a copy set/stack to the center stapling position is completed)
3. Raising the movable guide
   (When the trailing edge of a copy set/stack deactivates the saddle exit sensor)

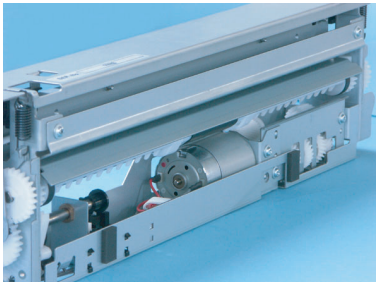
5.5 Center creasing mechanism

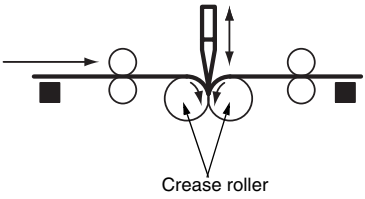
- The entrance sensor detects the trailing edge of the paper.
- The paper feed amount is determined for each paper size as counted from the timing when the trailing edge is detected. Center creasing is effected as follows. Specifically, the paper undergoes a switchback operation and is transported to the center creasing position as the motor is turned backward.
- The crease chopper is lowered and the center of the paper is pinched between the crease rollers and this creates a crease in the paper.
- After the center creasing, the paper is transported by the transport roller and then the registration roller as they are driven in that order.

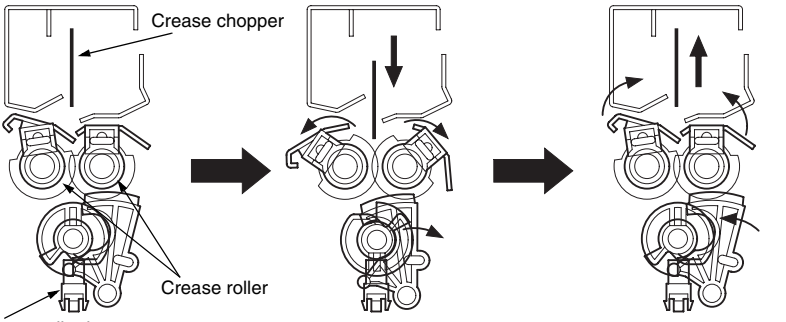


5.5.1 Operation

- When the crease motor is energized for one cycle of operation, the lower transport guides are retracted to the right and left and the crease chopper makes one up-and-down reciprocating motion. In synchronism with the sequence of these operations, the crease roller turns one complete turn to pull the paper downward at its center.
- At the same time that the lower transport guides returns to their original position, the crease chopper goes up.
- The position of the crease chopper is detected by the crease roller home position sensor.





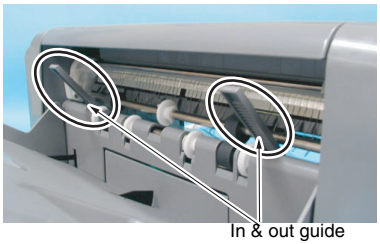


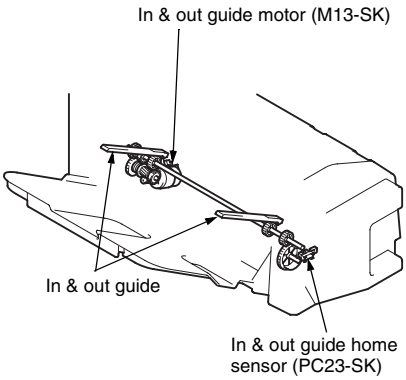
5.6 In & out guide

- When the papers are discharged to the tray, the in and out guide keeps the front edge of the large size paper so the discharged paper will not be pushed at its back edge by the following discharged paper.
- The guide operates only when holding the paper which size is 257 mm or over (B4 or over).
- The in & out guide advances when the entrance sensor of the finisher is deactivated and retracts when the trailing edge of the paper leaves the saddle exit sensor.

5.6.1 In & out guide mechanism

- The in & out guide motor drives the in & out guide.
- The position of the in and out sensor will be detected by the in and out guide home sensor.





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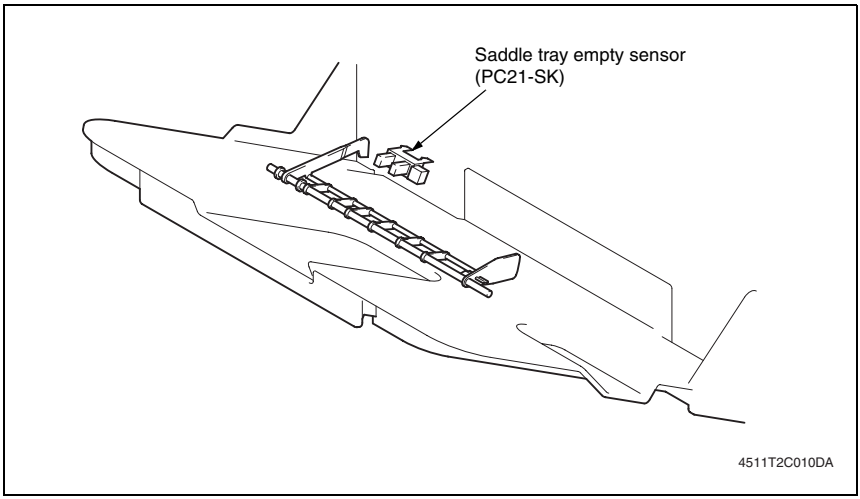
5.7 Tray paper detection

- When paper is fed onto the tray, it pushes the actuator, which causes the paper detection sensor to detect the paper.



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KONICA MINOLTA

SERVICE MANUAL

THEORY OF OPERATION

JS-601

2005.07

KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

Revision history

After publication of this service manual, the parts and mechanism may be subject to change for improvement of their performance.
Therefore, the descriptions given in this service manual may not coincide with the actual machine.

When any change has been made to the descriptions in the service manual, a revised version will be issued with a revision mark added as required.

Revision mark:

- To indicate clearly a section revised, show △1 to the left of the revised section.
  A number within △1 represents the number of times the revision has been made.

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Date	Service manual Ver.	Revision mark	Descriptions of revision
2005/07	1.0	—	Issue of the first edition

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JS-601

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Composition/Operation

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3. Center cross section 4
4. Mechanical operation 5
4.1 Job tray paper transport mechanism 5

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Outline

1. Product specification

A. Type

Name	Job separator
Installation	Fixed to Finisher
Document Alignment	Center

B. Functions

Modes	Non-Sort (in the fax or printer output mode)

C. Paper type

Type	Size	Weight	Tray Capacity
Plain paper	A5S to A3 5-1/2 × 8-1/2S to 11 × 17	60 to 90 g/m^2 16 to 24 lb	100 sheets: A4, 8-1/2 × 11 (80 g/m^2, 21-1/4 lb) 50 sheets: except A4, 8-1/2 × 11 (80 g/m^2, 21-1/4 lb) (Height: up to 28 mm, 1 lb)

D. Machine specifications

Power Requirements	DC 5 V, DC 24 V (supplied from Finisher)
Dimensions	341 mm (W) × 527 mm (D) × 149 mm (H) 13-1/2 inch (W) × 20-3/4 inch (D) × 5-3/4 inch (H)
Weight	1.75 kg (3.75 lb)

E. Operating environment

Conforms to the operating environment of the main body.

NOTE

- **These specifications are subject to change without notice.**

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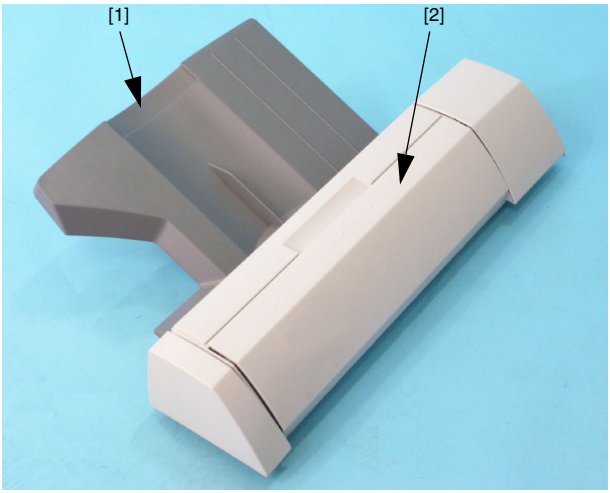
Composition/Operation

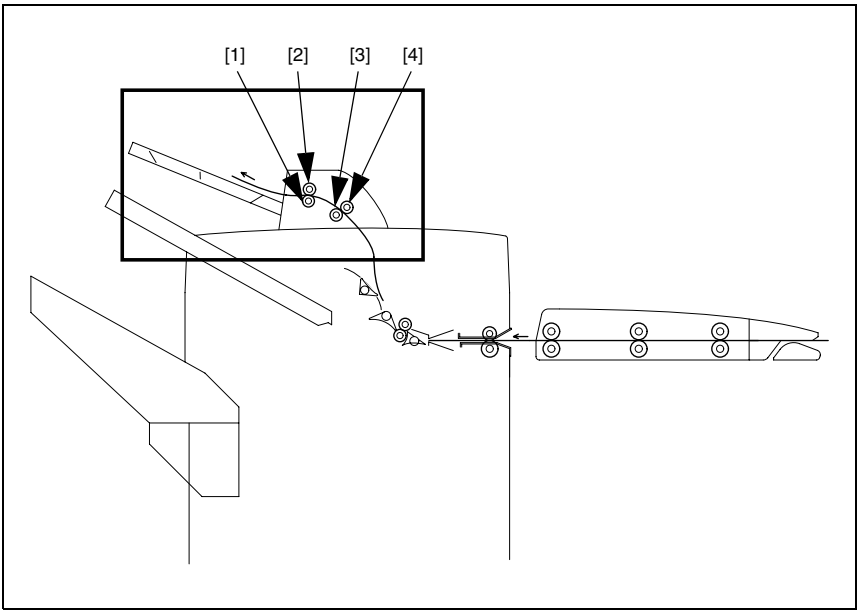
2. Overall composition



[1] Job Tray

[2] Job Separator Cover

3. Center cross section

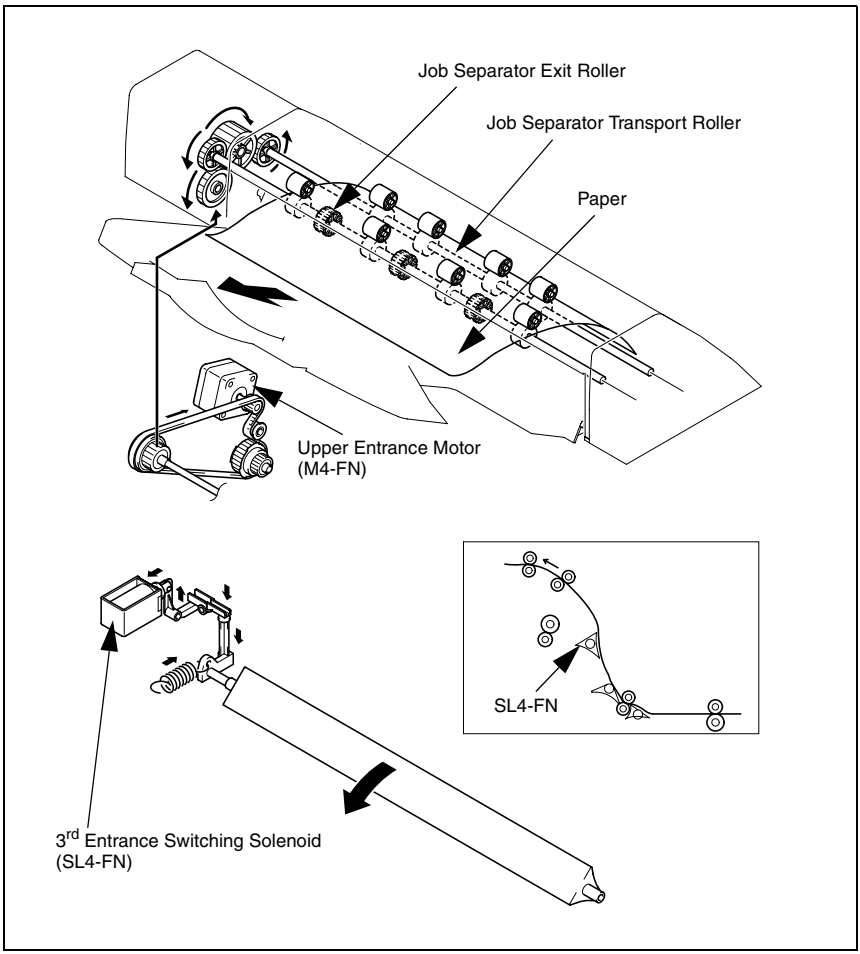


[1] Job Separator Exit Roller
[2] Job Separator Exit Roll
[3] Job Separator Transport Roller
[4] Job Separator Transport Roll

4. Mechanical operation

4.1 Job tray paper transport mechanism

- The job Separator Transport Roller and job Separator Exit Roller turn to transport the paper into the job Tray as the motor is energized.
- The 1st Tray Entrance Switching Solenoid, Upper/Lower Entrance Switching Solenoid, and 3rd Entrance Switching Solenoid are energized to select the paper path into the job Tray.



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KONICA MINOLTA

SERVICE MANUAL

THEORY OF OPERATION

FS-603

2005.07

KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

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Date	Service manual Ver.	Revision mark	Descriptions of revision
2005/07	1.0	—	Issue of the first edition

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5.4.3 Folding mechanism 27
5.4.4 Paper folding start position 28

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Outline

1. Product specification

A. Type

Type	Multi Staple Finisher with Saddle (Booklet)
Installation	Freestanding
Document Alignment	Center
Supplies	Staple Cartridge

B. Functions

Modes	Normal	Group, Sort, Group Offset, Sort Offset, Sort Staple, Center Staple & Fold
	Punch (Option)	Group Punch, Sort Punch, Group Offset Punch, Sort Offset Punch, Sort Staple Punch

C. Paper type

- Remove the finisher off the Copier for feeding the long paper.
- The maximum loading capacity shown is for when loading the single type of paper (80 g/m^2).

(1) Group, Sort

Type	Size	Weight	Tray Capacity *1			Exit Tray	No. of Sheets to be Stapled
Plain Paper	B5S/B5 to A3 wide 5.5 × 8.5S/ 5.5 × 8.5 to 12.25 × 18	60 to 90 g/m^2 16 to 24 lb	No. of Sheet Height	A4S/ 8.5 × 11S or smaller 1000 150 mm	B4/ 8.5 × 14 or larger 500 75 mm	1st paper exit tray	-
Envelop OHP Film Label Paper Thick Paper		60 to 256 g/m^2 16 to 68 lb	20 sheet				

*1: Controlled by whichever reached earlier

(2) Sort offset, Sort group

Type	Size	Weight	Tray Capacity			Exit Tray	No. of Sheets to be Stapled
Plain Paper	A5, B5S/B5 to A3 8.5 × 11S/ 8.5 × 11 to 11 × 17	60 to 90 g/m^2 16 to 24 lb	No. of Sheets Height	A4S/ 8.5 × 11S or smaller 1000 150 mm	B4/ 8.5 × 14 or larger 500 75 mm	1st paper exit tray	-
			Controlled by whichever reached earlier				

(3) Sort staple

<table>
<tr><th>Type</th><th>Size</th><th>Weight</th><th colspan="4">Tray Capacity</th><th>Exit Tray</th><th colspan="2">No. of Sheets to be Stapled</th></tr>
<tr><td rowspan="4">Plain Paper
Thick Paper</td><td rowspan="4">B5S/B5 to A3
8.5 × 11S/
8.5 × 11 to
11 × 17</td><td rowspan="4">Normal Mode
60 to 90 g/m^2
16 to 24 lb

Cover Mode
60 to 209 g/m^2
16 to 55.5 lb</td><td></td><td>A4S/
8.5 × 11S
or smaller</td><td>B4/
8.5 × 14
or larger</td><td rowspan="4">1st
paper
exit tray</td><td colspan="2">Normal Mode *1</td></tr>
<tr><td>No. of Sheets</td><td>1000</td><td>500</td><td>A4S/
8.5 × 11S
or smaller</td><td>B4/
8.5 × 14
or larger</td></tr>
<tr><td>Height</td><td>150 mm</td><td>75 mm</td><td>2 to 50</td><td>2 to 25</td></tr>
<tr><td>No. of Sets</td><td>30</td><td>30</td><td colspan="2"></td></tr>
<tr><td colspan="4">Controlled by whichever reached earlier</td><td colspan="3"></td></tr>
</table>

*1: The number of Sheets to be Stapled is limited for high-density images.
(Color Wise: 20 sheets x 20 sets)

(4) Center Staple & Fold

Type	Size	Weight	Tray Capacity	Exit Tray	No. of Sheets to be Stapled
Plain Paper	A4S, B4, A3 8.5 × 11S/ 11 × 17	60 to 90 g/m^2 16 to 24 lb	10 sets (No. of Sheets to be Stapled: 6 to 15 sheets) 20 sets (No. of Sheets to be Stapled: 2 to 5 sheets)	2nd paper exit tray	Black copy 2 to 15 sheets (Max. 60 pages) Other copy 2 to 10 sheets (Max. 40 pages)

D. Stapling

<table>
<tr><td>Staple Filling Mode</td><td colspan="2">Dedicated Staple Cartridge Mode (5000 staples)</td></tr>
<tr><td>Staple Detection</td><td colspan="2">Available (Nearly Empty: 40 remaining staples)</td></tr>
<tr><td rowspan="4">Stapling Position</td><td>Rear: Parallel 1 point</td><td rowspan="4">B5S/B5 to A3,
8.5 × 11S/8.5 × 11 to 11 × 17</td></tr>
<tr><td>Front: Parallel 1 point</td></tr>
<tr><td>Side: Parallel 2 points</td></tr>
<tr><td>Center: Parallel 2 points</td></tr>
<tr><td>Manual Staple</td><td colspan="2">None</td></tr>
<tr><td>Folding Mode</td><td colspan="2">Roller Pressure Folding</td></tr>
<tr><td>Folding Position</td><td colspan="2">Center of Paper</td></tr>
</table>

E. No. of sheets to be stapled (sort staple)

(1) A4S, 8.5 × 11S or smaller

No. of Sheets to be Stapled	No. of Sets		
	Rear: Parallel	Center: Parallel	Front: Parallel
2	100	40	40
3 to 5	80	40	40
6 to 10	60	40	40
11 to 20	30	30	30
21 to 30	30	30	30
31 to 50	30 sets or 1000 sheets		

(2) B4, 8.5 × 14 or larger

No. of Sheets to be Stapled	No. of Sets		
	Rear: Parallel	Center: Parallel	Front: Parallel
2	100	50	50
3 to 5	80	40	40
6 to 10	40	40	40
11 to 20	30 sets or 1000 sheets		
21 to 25			

F. Machine specifications

Power Requirements	DC 24 V (supplied from the main body)
	DC 5 V (generated by Finisher)
Max. Power Consumption	65 W or less
Dimensions	601 mm (W) × 603 mm (D) × 933 mm (H) 23.75 inch (W) × 23.75 inch (D) × 36.75 inch (H)
Weight	41.6 kg (91.75 lb)

G. Operating environment

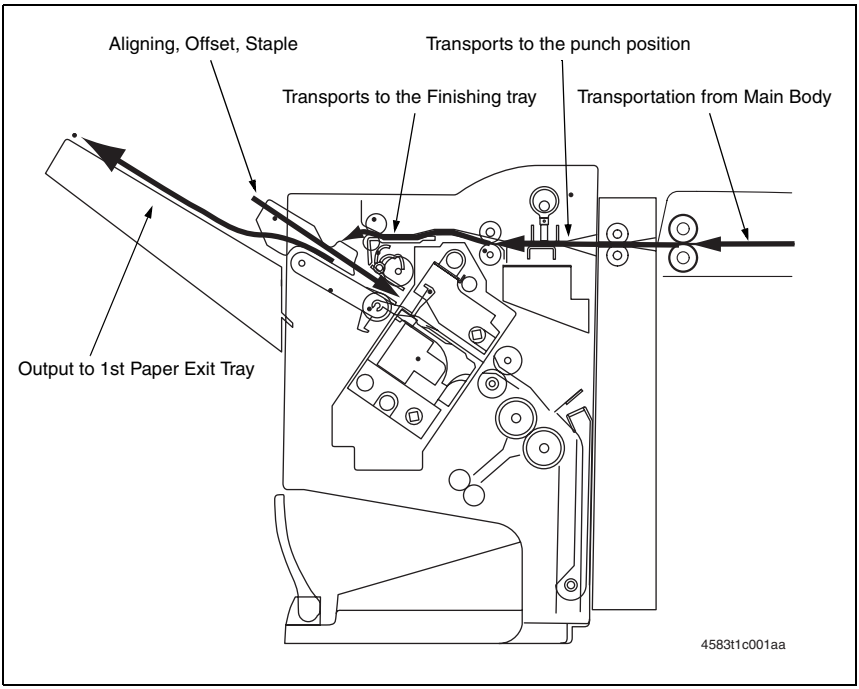
Conforms to the operating environment of the main body.

NOTE

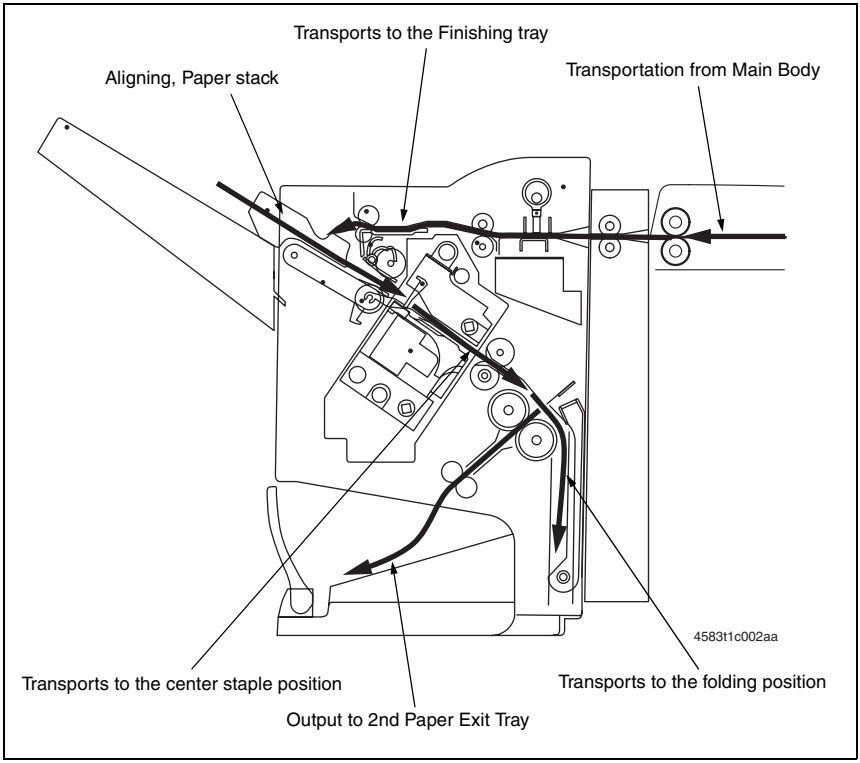
- **These specifications are subject to change without notice.**

2. Paper Feed Path

2.1 Output the 1st paper exit tray


Aligning, Offset, Staple
Transports to the punch position
Transports to the Finishing tray
Transportation from Main Body
Output to 1st Paper Exit Tray
4583t1c001aa

2.2 Output the 2nd paper exit tray


Transports to the Finishing tray
Aligning, Paper stack
Transportation from Main Body
4583t1c002aa
Transports to the center staple position
Transports to the folding position
Output to 2nd Paper Exit Tray

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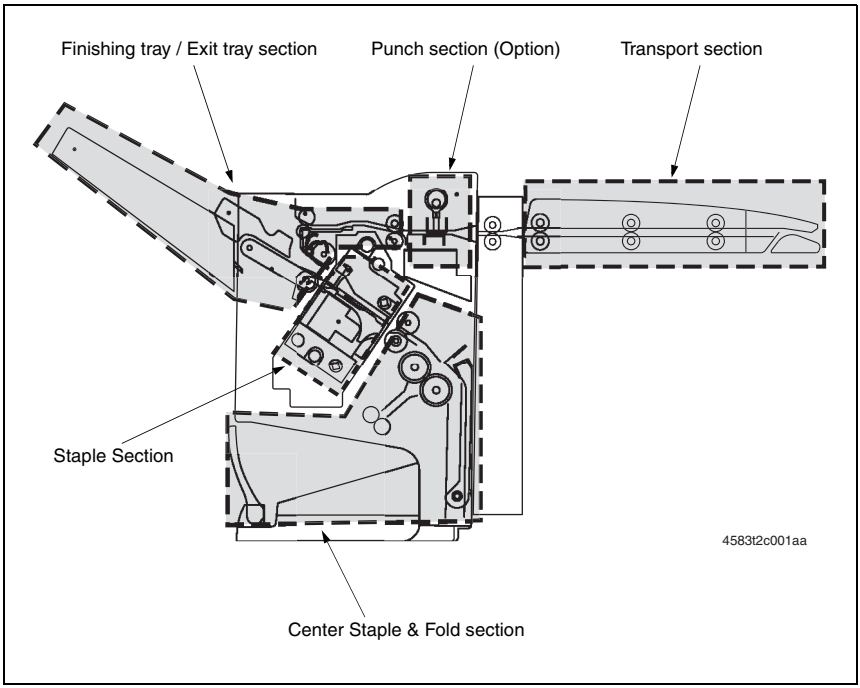
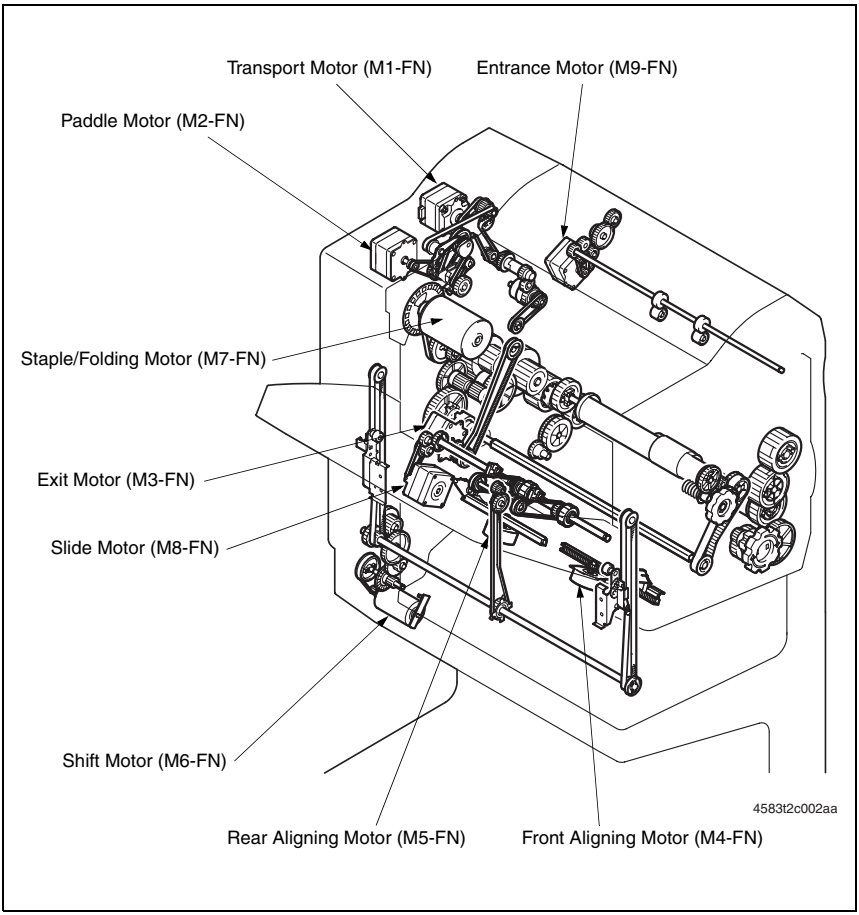
Composition/Operation

3. Composition



4. Drive

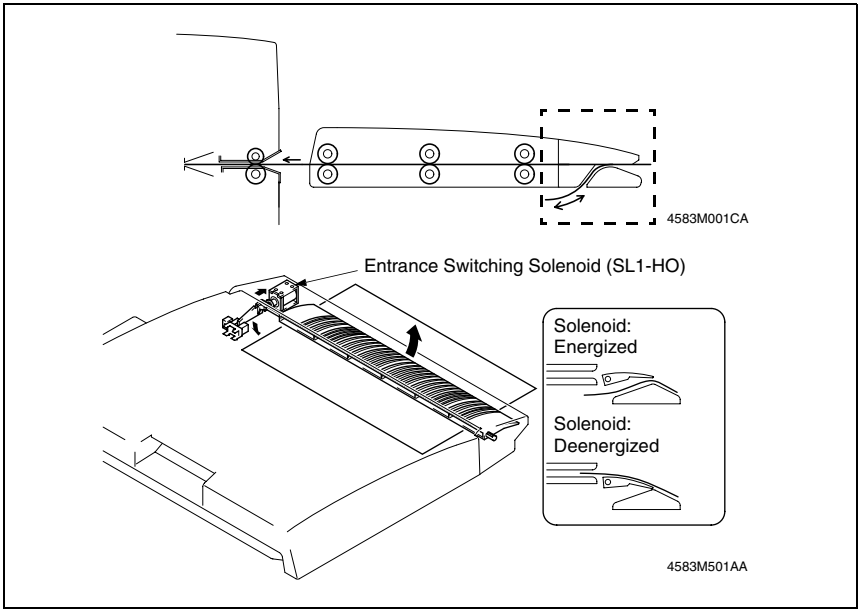

Transport Motor (M1-FN)
Entrance Motor (M9-FN)
Paddle Motor (M2-FN)
Staple/Folding Motor (M7-FN)
Exit Motor (M3-FN)
Slide Motor (M8-FN)
Shift Motor (M6-FN)
Rear Aligning Motor (M5-FN)
Front Aligning Motor (M4-FN)
4583t2c002aa

5. Operation

5.1 Transport Section

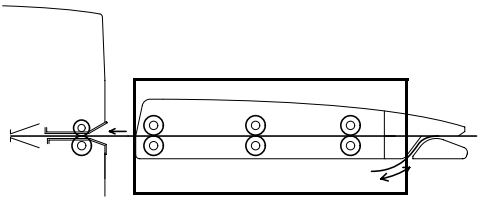
5.1.1 Paper path switching mechanism

- The path along which the paper is transported is selected with the Entrance Switching Solenoid.
- During a 2-sided print mode, the solenoid is energized to feed the paper into the lower path and then feed it back to the main body.
- In a 1-sided print mode, and when a 2-sided printed page is fed in the 2-sided print mode, the Entrance Switching Solenoid is deenergized so that the paper can be transported to the Finisher.



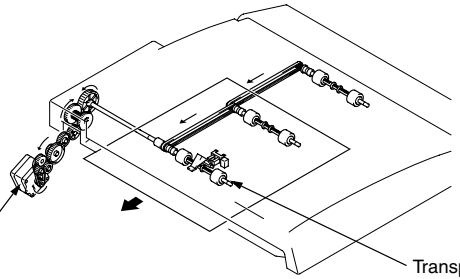
5.1.2 Finisher paper transport mechanism

- Drive from the Transport Motor turns the Transport Roller to transport paper fed from the main body onto the Finisher.
- The Transport Roller on the Finisher side is driven by the Transport Motor to feed the paper through the Finisher.



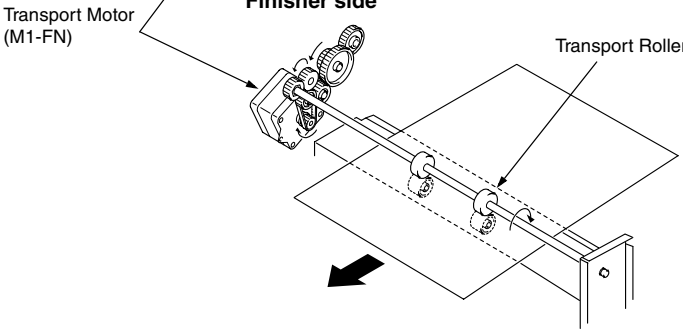
4583M001CA

Horizontal Unit side



4853M003AB

Finisher side

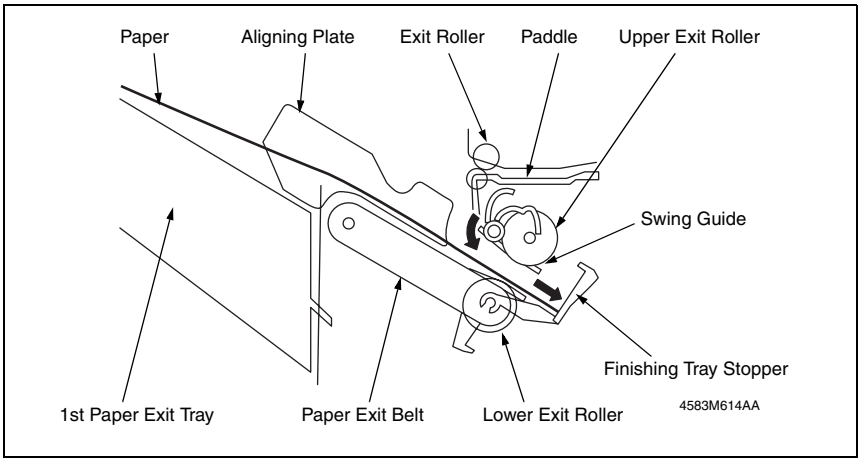


4643M007AD

5.2 Finishing tray mechanism

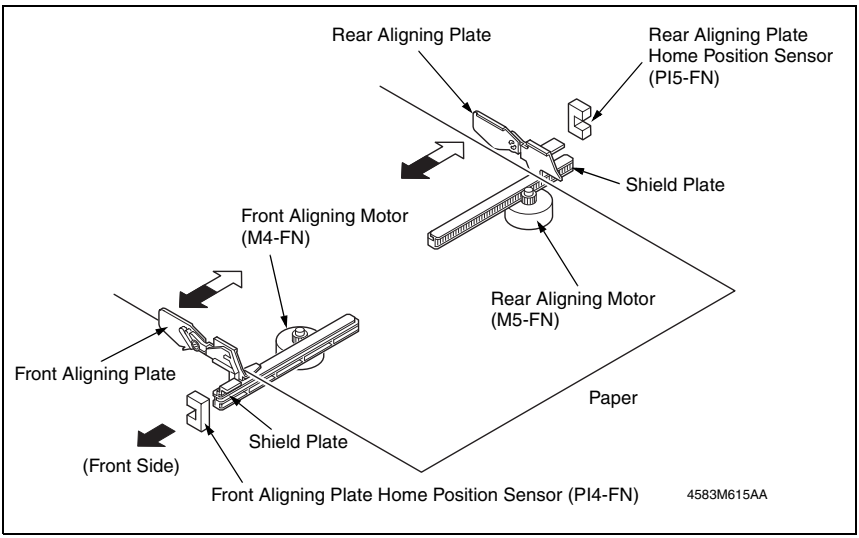
5.2.1 Paper stacking with finishing tray

- After the paper has been fed through the Exit Roller, the paper drops onto the Finishing Tray. Then, the Paddle taps the top of the paper twice (once for the additional sheets) so that the trailing edge of the paper reaches the Finishing Tray Stopper.
- After Paddle operation is finished, Swing Guide will be lowered to prevent curling of paper.
- The Paddle Motor provides the drive for the Paddle and Its home position is detected with the Paddle Home Position Sensor.



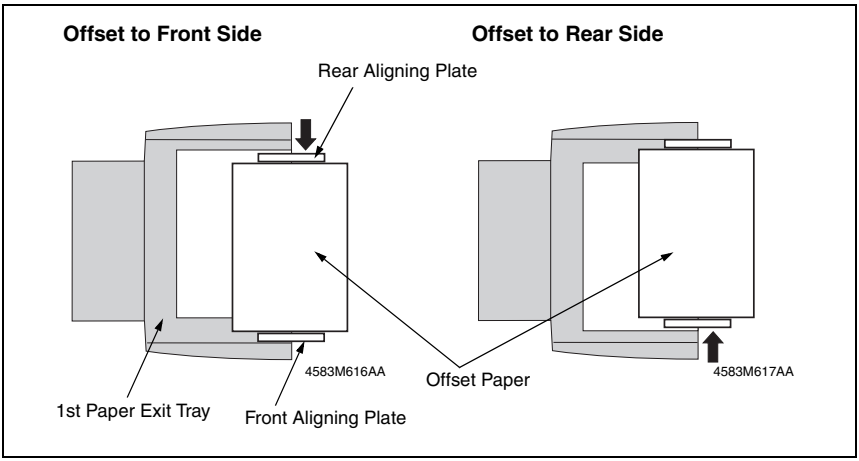
5.2.2 Aligning mechanism

- Two Aligning Plates are moved by drive of the Front, or Rear Aligning Motor in the forward or reverse direction.
- The Aligning Plates home position is detected with the Front, or Rear Aligning Plate Home Position Sensor. With reference to this home position, the amount of movement of the Aligning Plate is determined.



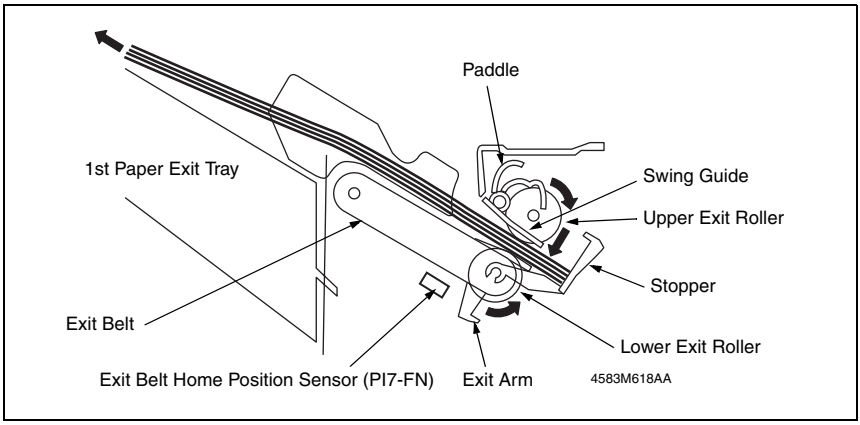
5.2.3 Offsetting operation

- Whenever the paper is stacked, it is moved toward the front or rear side by the Front or Rear Aligning Plate. Accordingly, the offsetting operation is made whenever the paper is fed onto the Finishing Tray.



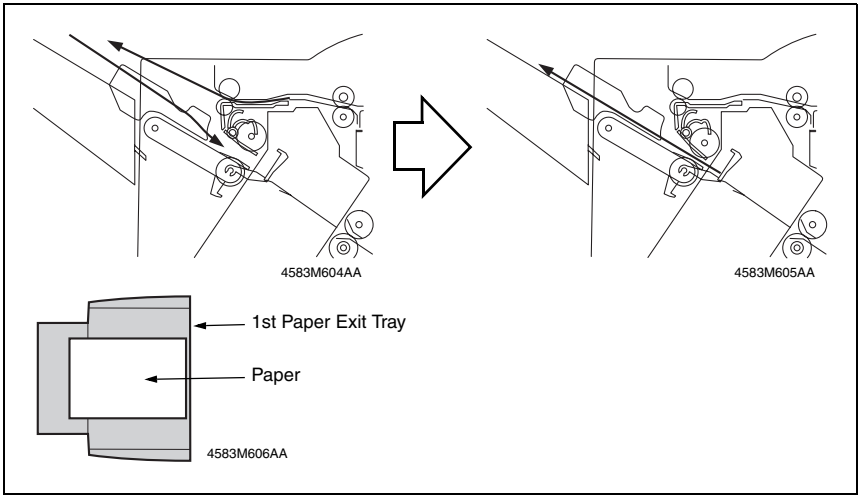
5.2.4 Exiting operation

- The Paddle, driven by the Paddle Motor, makes the Swing Guide move down and then the paper is taken up with the Upper, and Lower Exit Arm.
- Next, the Exit Motor rotates in the forward direction to transport the paper taken up with the Exit Rollers toward the Exit Section by the Exit Rollers and the Exit Arm.
- The Exit Belt Home Position Sensor turns OFF and then the Swing Guide moves up after the Motor has been driven for a given number of pulses. The Exit Motor is driven to transport a stack of paper with the Exit Arm, of the Exit Belt, rotating in synchronization with the Lower Exit Roller onto the 1st Paper Exit Tray.



5.2.5 Group mode, Sort mode

- Paper is taken back onto the Finishing Tray and then fed out onto the 1st Paper Exit Tray.

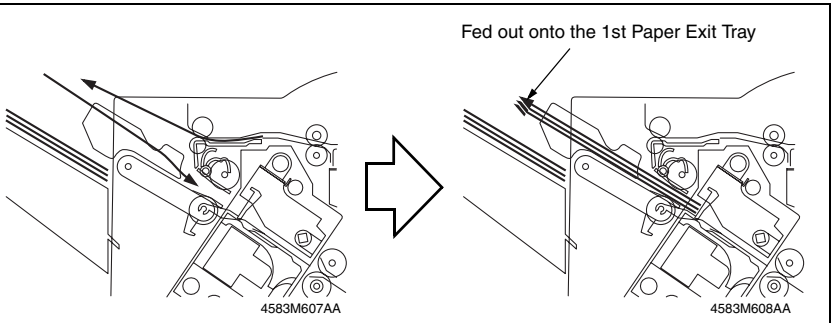


Paper Transport

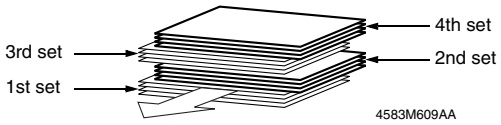
Finishing Tray → 1st Paper Exit Tray

5.2.6 Offset mode

- In the Offset Mode, Paper is taken back onto the Finishing Tray and shifted to the front or rear side with the Aligning Plate. Then, a stack of paper per set is fed out onto the 1st Paper Exit Tray.
- However, even if printing has not been completed for all sets of prints, when 10 sheets for the large size whose length is longer than 300mm or 30 sheets for the small size whose length is shorter than 299mm are stacked, a set of sheets is fed out onto the 1st Paper Exit Tray.



Paper Stacking for 4 sets in Sort Mode

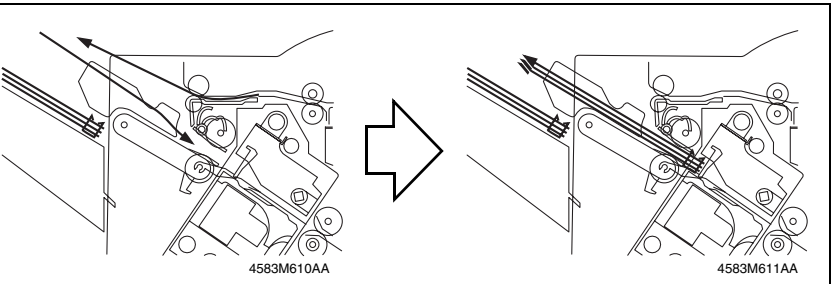


Paper Transport

Finishing Tray → Shifted with the Aligning Plate for each job → 1st Paper Exit Tray

5.2.7 Staple Mode

- In the Staple Mode, when one complete set of prints is fed out onto the Finishing Tray, stapling is performed. A stack of stapled paper is then fed out onto the 1st Paper Exit Tray.

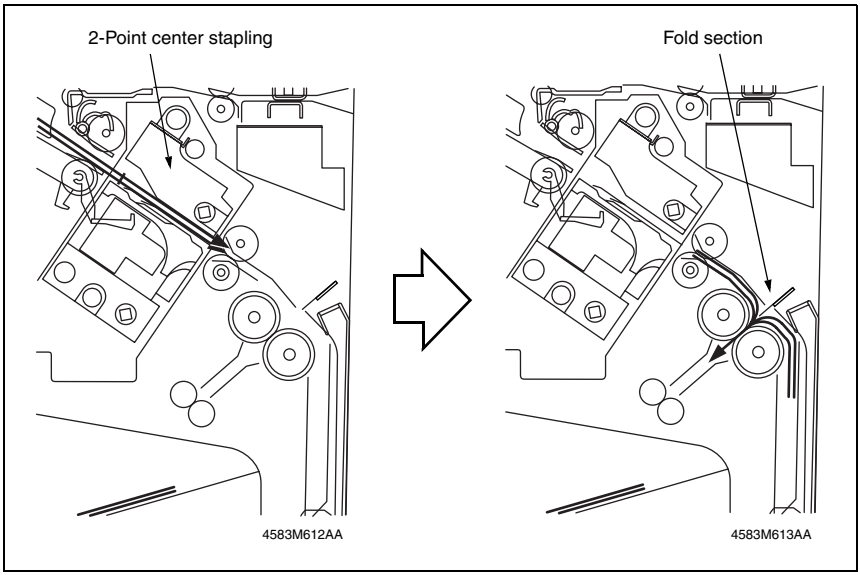


Paper Transport

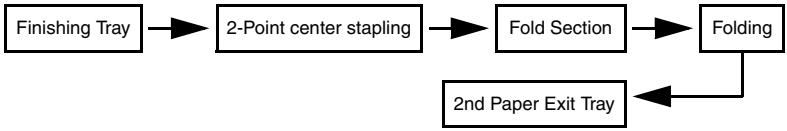
Finishing Tray → Stapling for one set of prints → 1st Paper Exit Tray

5.2.8 Center Staple & Fold mode

- In Staple section, A stack of paper fed onto the Finishing Tray is stapled (at two places) and then transported to the Fold Section.
- The paper transported to the Fold section is folded, and then fed out onto the 2nd Paper Exit Tray.
- The maximum number of the Center Staple & Fold.
  Black copy: 2 to 15 sheets (Max. 60 pages)
  Other copy: 2 to 10 sheets (Max. 40 pages)



Paper Transport



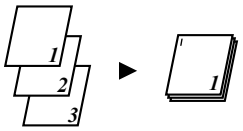
5.3 Staple unit

5.3.1 Types and positions of staples

- Shown here are the different stapling positions used with the FS-601.

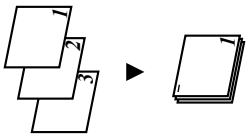
Type	Paper Size (Metric area)	Paper Size (Inch area)
Corner stapling (Rear)	B5, B5S, A4, A4S, B4, A3	8.5×11, 8.5×11S, 8.5×14, 11×17
Corner stapling (Front)		
2-Point side stapling		
2-Point center stapling	A4S, B4, A3	8.5×11, 11×17

Corner stapling (Rear)



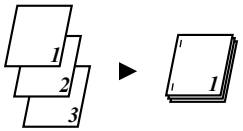
C4004o082AA

Corner stapling (Front)



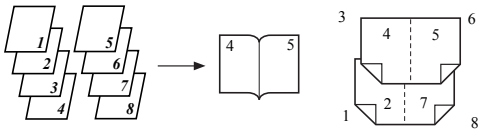
C4004o081AA

2-Point side stapling



C4004o083AA

2-Point center stapling



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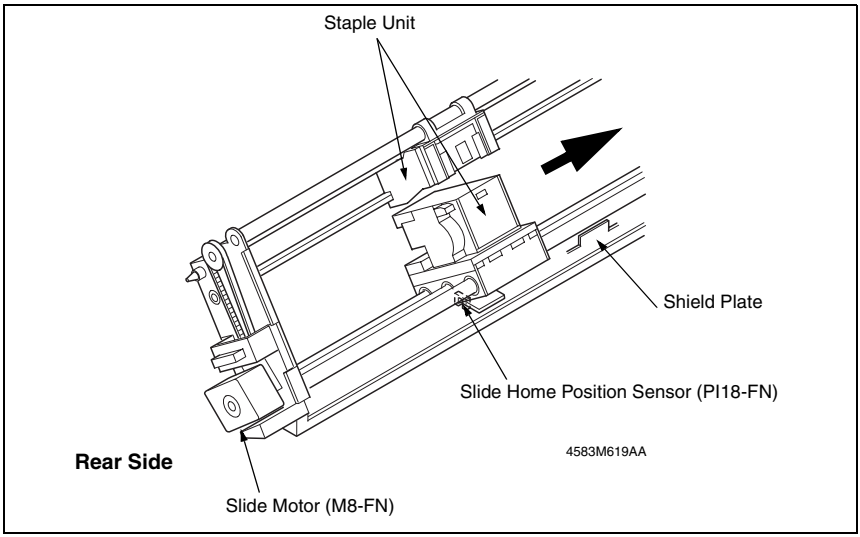
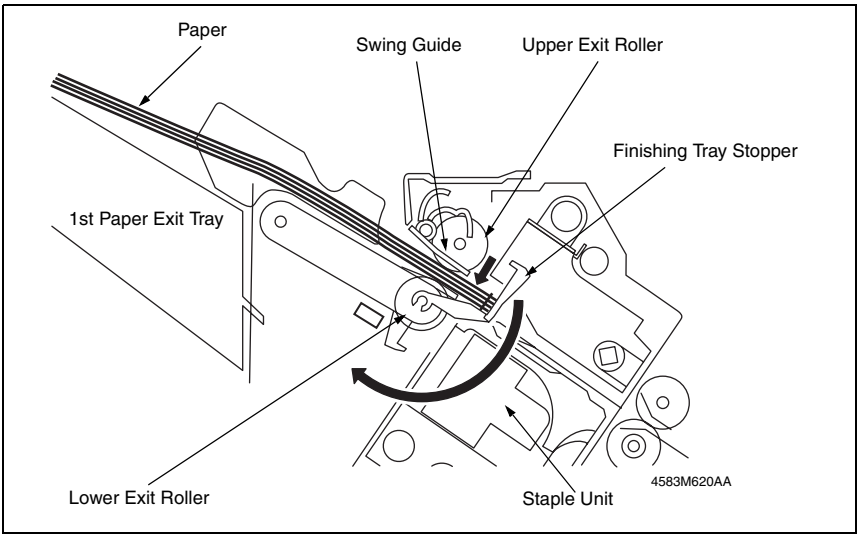
5.3.2 Staple unit moving mechanism

- When the Power Switch is turned ON, or the Front Door is opened and closed, the Staple Unit is moved to the front side with the forward rotation of the Slide Motor and stopped at the position where the Slide Home Position Sensor located at the bottom of the Staple Unit is blocked by the Light Shield Plate.
- The Staple Unit is moved to the rear side with the backward rotation of the Slide Motor and stopped at its standby position.
- This standby position is determined by the number of pulses input to the Slide Motor since it is a stepping type motor.



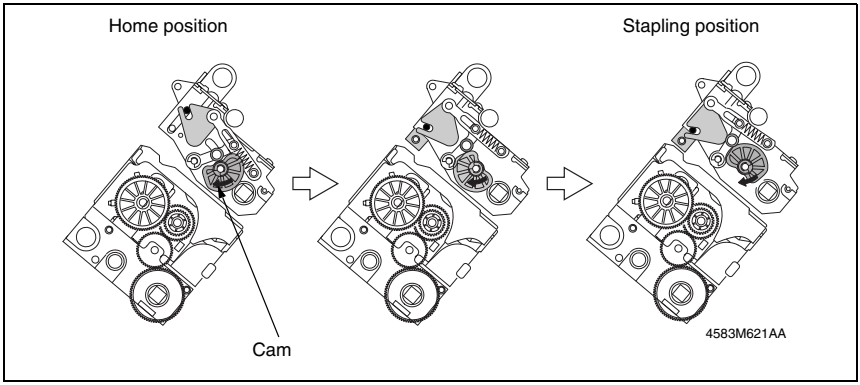
5.3.3 Staple operation

- After the paper stacking and alignment operation on the Finishing Tray have been completed, a stack of paper is taken up with the Upper, and Lower Exit Rollers by moving the Swing Guide down with the Paddle Motor rotating in the reverse direction.
- Stapling is performed by moving the Staple Unit according to the specified stapling position. However, if stapling is made at one place at the rear side, it is made at the stand-by position without movement of the Stapler Unit.
- If the Staple Unit is moved toward the front side, the Finishing Tray Stopper is lowered.



5.3.4 Staple unit

- The Stapling operation is accomplished by a Cam rotated once with the Staple/Folding Motor.
- The Home position of this Cam is detected with the Staple Drive Home Position Sensor. If the Staple Drive Home Position Sensor is OFF, the Staple/Folding Motor rotates in the forward direction until the Sensor is blocked or the signal is ON, which designates that the position of the Cam is ready for the next stapling operation.
- The Staple Detecting Sensor detects if the Staple Cartridge is in the Unit and if the staples are in the Staple Cartridge.
- A Self-Priming Sensor detects if the staples are positioned at the end of the Staple Cartridge.
- This Finisher is equipped with the safety protection mechanism. The Staple/Folding Motor will not be turned ON without an ON condition (with Swing Guide closed) of the Front and Rear Staple Safety Switches.



5.3.5 Staple unit moving control

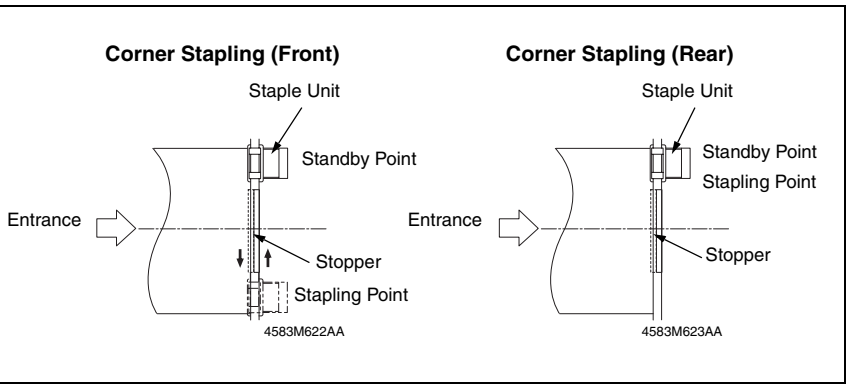
- The Staple Unit is moved with the Slide Motor and its home position is detected with the Slide Home Position Sensor.
- Regardless of the staple mode or paper size, the staple unit always returns to the stand by position on the rear side.

<For the Corner stapling Front Position>

- The Staple Unit stands by on the rear side, and then move to the staple position corresponding to the paper size at each stapling operation.

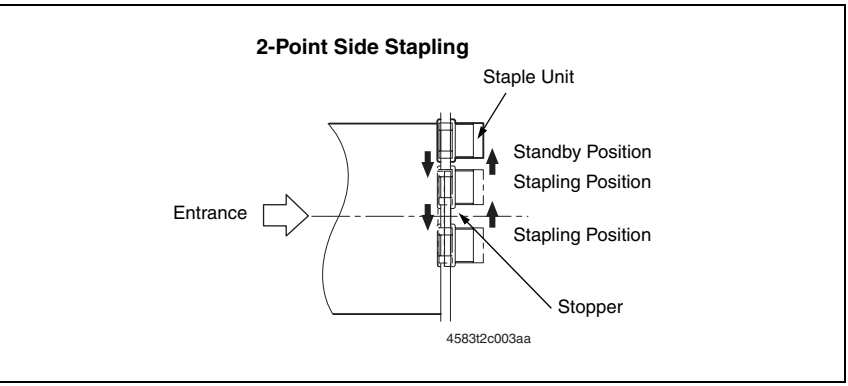
<When the Corner stapling Rear Position is used>

- The Staple Unit is at the home position on the rear side. The staple position is the same as standby home position. The staple position of 2-point stapling at the rear side is used only for B5S.



<For 2 point side stapling Operation>

- The Staple Unit stays at the home or the rear side, and then moves to the stapling position at each of stapling operation.
- The order of stapling is first the rear side, and then the front side.

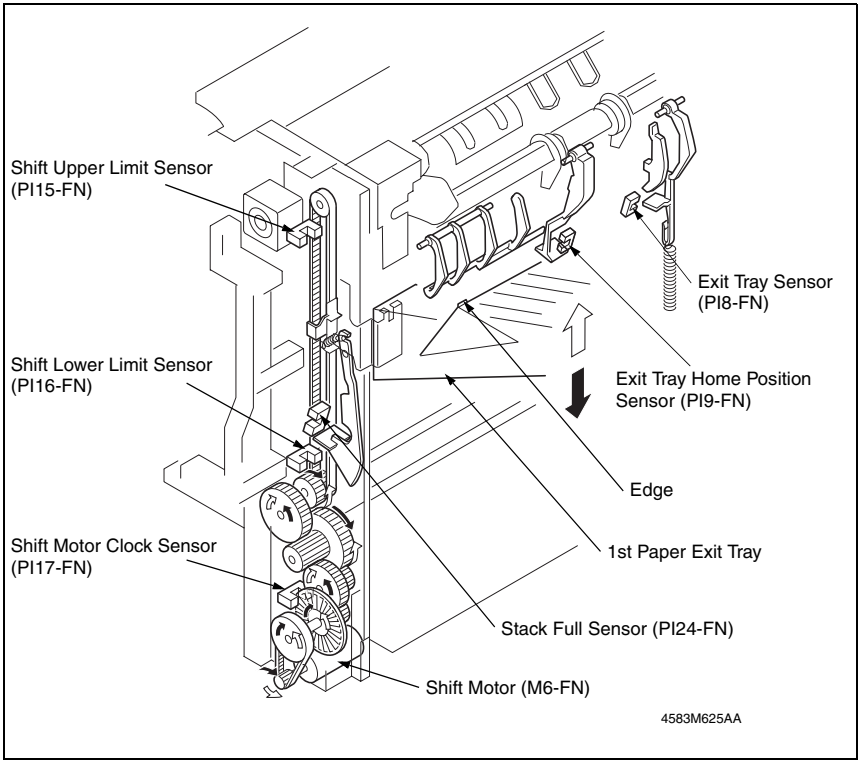


<For 2-point Center stapling operation>

The 2-point center stapling operation is the same as 2-point side stapling.

5.3.6 1st Paper Exit Tray mechanism

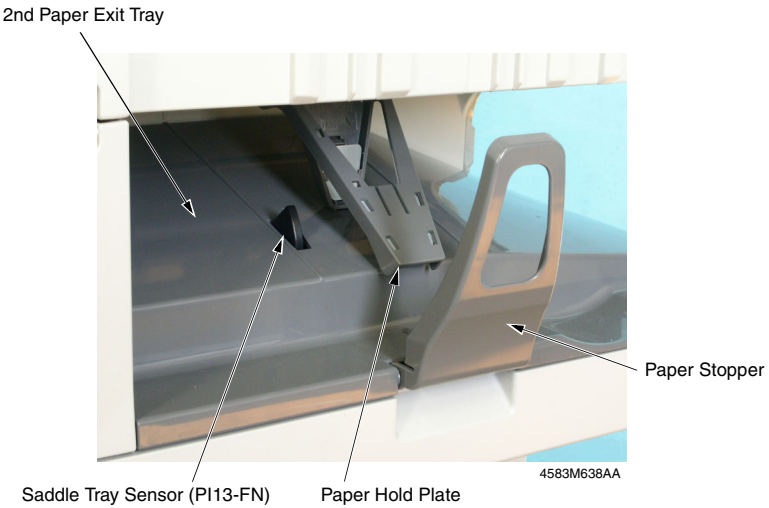
- The 1st Paper Exit Tray is moved up or down by drive from the Shift Motor and the Exit Tray Sensor detects if the paper is stacked on the 1st Paper Exit Tray.
- The Exit Tray Home Position Sensor detects if the 1st Paper Exit Tray is at its home position.
- If the paper is stacked on the 1st Paper Exit Tray, home position is at the top side of paper and if not, the home position is at the edge of the 1st Paper Exit Tray.
- When the main power is turned ON, the 1st Paper Exit Tray is returned to its home position by drive of the Shift Motor.
- After the paper has exited from the Finishing Tray and has been stacked onto the 1st Paper Exit Tray, the 1st Paper Exit Tray is moved down by the Shift Motor driven for a given number of clock pulses.
- The Clock pulse detection is generated with the Shift Motor Clock Sensor and the 1st Paper Exit Tray is returned to its home position for the next stacking operation.
- The Upper limit position of the 1st Paper Exit Tray is detected with the Shift Upper Limit Sensor. When the Shift Upper Limit Sensor is turned ON, (upward movement) drive from the Shift Motor is stopped.
- The Lower limit position of the 1st Paper Exit Tray is detected with the Shift Lower Limit Sensor. When the Shift Lower Limit Sensor is turned ON, (downward movement) drive from the Shift Motor is stopped.
- The Stack Full Sensor detects if an excessive amount of stacking is made due to the height of the stacked paper of large sizes or of mixed sizes.



5.4 Center Staple & Fold Section

5.4.1 2nd paper Exit Tray

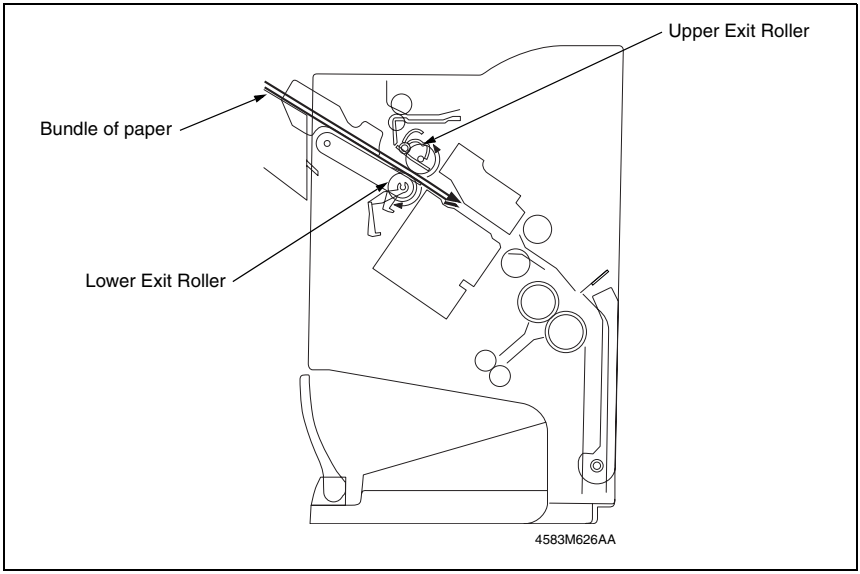
- The 2nd Paper Exit Tray is fixed and all the paper stacked as a booklet is exited onto this Tray.
- The Saddle Tray Sensor detects if the paper is stacked on the 2nd Paper Exit Tray, but does not detect a paper jam.



5.4.2 Transport operation in Center Staple & Fold section

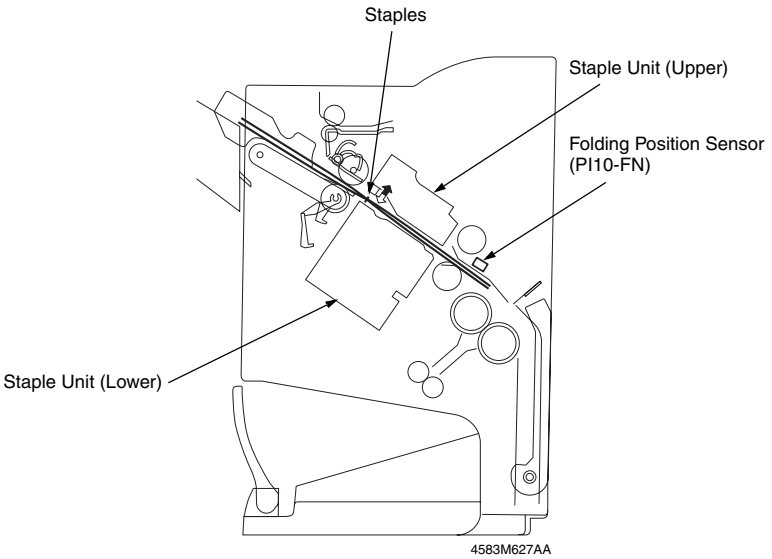
A. Paper transport

- After a stack of paper has been aligned on the Finishing Tray, it is taken up with the Upper and Lower Exit Rollers. With the rotation of the Upper and Lower Exit Rollers, a stack of paper is transported into the Stapling Section.



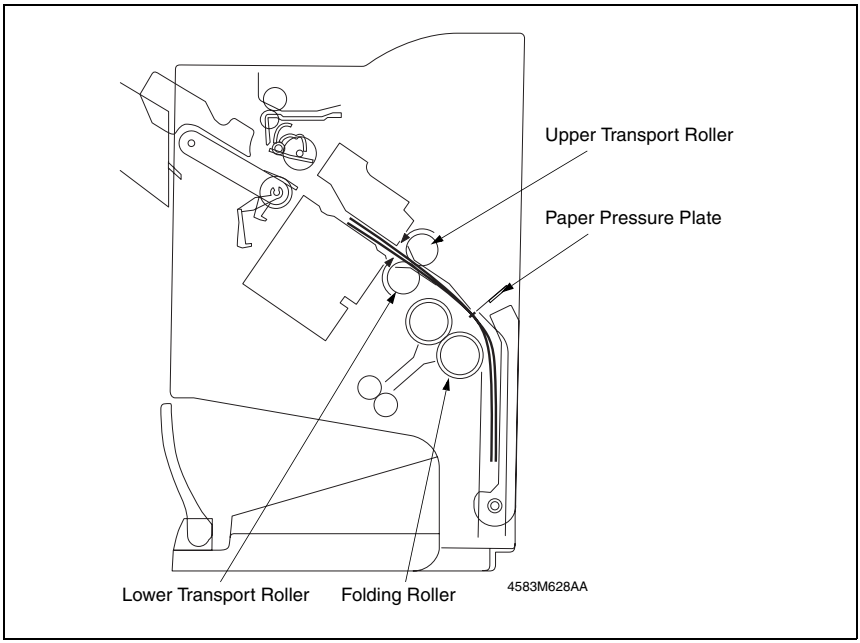
B. Stapling

- The stack of paper is further transported and temporarily stopped when the center area of the paper (the area where stapling will be made) has reached the position of the staples in the Staple Unit. Then, a stapling operation is cycled at the center area with the Staple Unit.



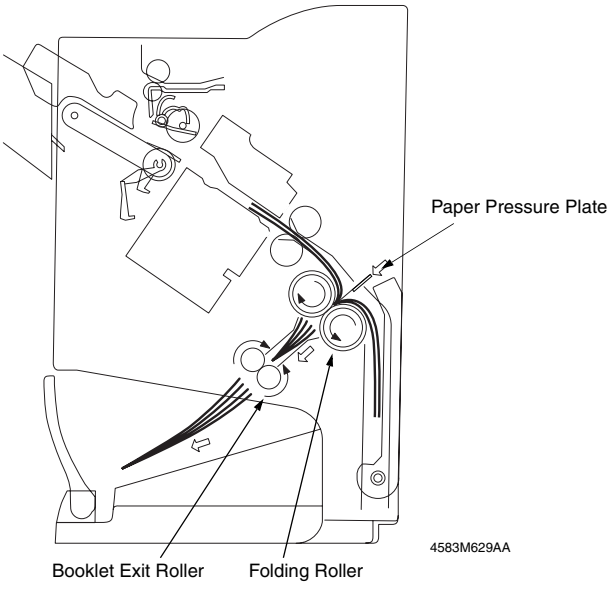
C. Booklet Transport

- Next, the stack of paper that was stapled is transported to the paper folding / exit position with the Transport Rollers. The Paper folding /exit position is the position where the center of the paper (where stapled) is of the same height as that of the Paper Pressure Plate and nip area of the Folding Rollers.



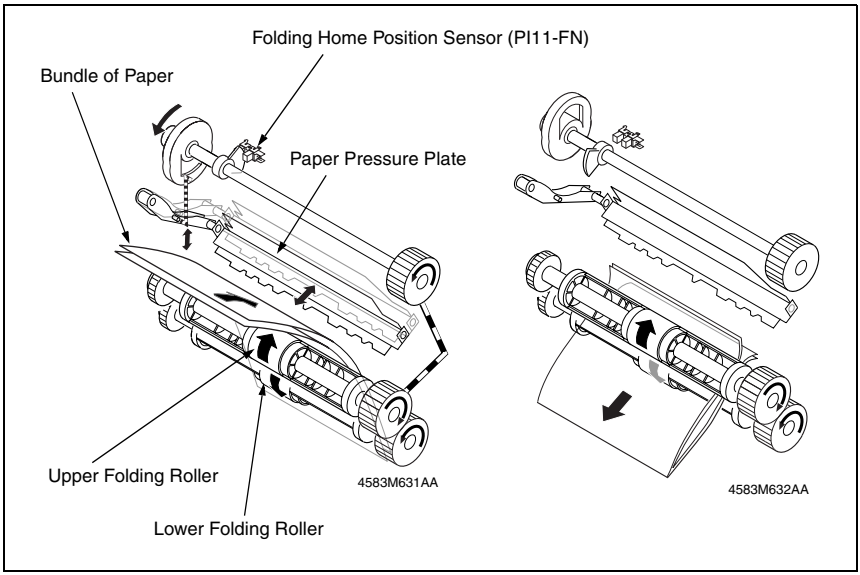
D. Folding/exit

- The Paper Pressure Plate presses the center of the paper to transport the paper toward the Paper Folding Rollers. Then the Paper Folding Rollers take up and fold the paper and feed the stack of paper onto the 2nd Paper Exit Tray through the Folding, and the Booklet Exit Rollers.



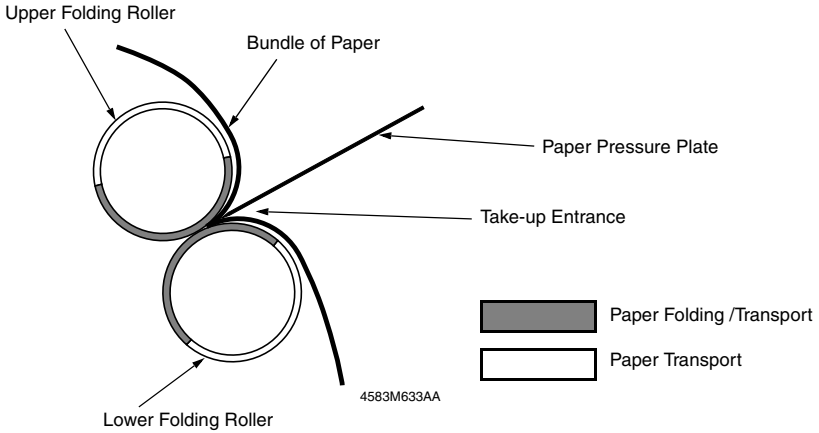
5.4.3 Folding mechanism

- The Paper Folding Mechanism consists of the Folding Rollers and Paper Pressure Plate.
- They are driven by the Staple/ Folding Motor respectively through the combination of the Gears and Cams etc. This Motor drive is monitored with the Staple/ Folding Motor Clock Pulse Sensor.
- The Folding Position Sensor is mounted to detect the position of the Folding Rollers and the Pressure Plate. The stack of folded paper is transported with the Folding Rollers and then exits via the Booklet Exit Rollers.

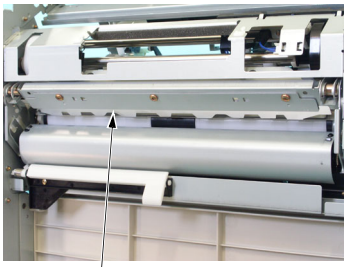


5.4.4 Paper folding start position

- Paper folding is created by the Paper Folding Plate and the Paper Pressure Plate. At the same time when the Folding Rollers start to rotate, the Paper Pressure Plate starts pressing the stack of paper to the contact area of the Paper Folding Rollers.
- For half of the Folding Rollers, no rubber material is used except at the center and both ends of the Folding Rollers. This half of the Upper and the Lower Folding Rollers, contacts each other at the center and both ends, and is only used to transport the paper, thus preventing wrinkles.
- The other half of the Upper and the Lower Folding Rollers, contacts each other completely, thereby folding and then transporting the paper.

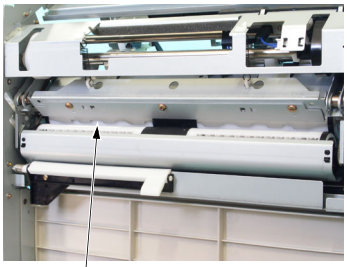


Paper Pressure Plate Home Position



The plate doesn't touch paper.

Paper Pressure Plate Start Position



The plate pushes paper

KONICA MINOLTA

SERVICE MANUAL THEORY OF OPERATION

PK-501/PK-4/ PK-131

2005.07

KONICA MINOLTA BUSINESS TECHNOLOGIES, INC. Ver. 1.0

Revision history

After publication of this service manual, the parts and mechanism may be subject to change for improvement of their performance.
Therefore, the descriptions given in this service manual may not coincide with the actual machine.

When any change has been made to the descriptions in the service manual, a revised version will be issued with a revision mark added as required.

Revision mark:

- To indicate clearly a section revised, show △1 to the left of the revised section.
  A number within △1 represents the number of times the revision has been made.

- To indicate clearly a section revised, show ▲1 in the lower outside section of the corresponding page.
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NOTE

Revision marks shown in a page are restricted only to the latest ones with the old ones deleted.

- When a page revised in Ver. 2.0 has been changed in Ver. 3.0:
  The revision marks for Ver. 3.0 only are shown with those for Ver. 2.0 deleted.
- When a page revised in Ver. 2.0 has not been changed in Ver. 3.0:
  The revision marks for Ver. 2.0 are left as they are.

Date	Service manual Ver.	Revision mark	Descriptions of revision
2005/07	1.0	—	Issue of the first edition

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PK-501/PK-4/PK-131

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Outline

1. Product specification

A. Functions

No. of Holes (optional)	Metric: 4holes, Inch: 2holes / 3holes

B. Paper type

Type	Size		Weight	Tray Capacity	Exit Tray	No. of Sheets to be Stapled
Plain Paper Thick Paper	4 holes	A4, A3	60 to 209 g/m^2 16 to 55-1/2 lb	-	Elevator Tray	-
	2 holes	8-1/2 × 11S/ 8-1/2 × 11, 8-1/2 × 14, 11 × 17				
	3 holes	8-1/2 × 11, 11 × 17				

C. Machine specifications

Power Requirements	Supplied from FS-603
Dimensions	90 mm (W) × 530 mm (D) × 170 mm (H) 3-3/4 inch (W) × 20-3/4 inch (D) × 6-3/4 inch (H)
Weight	2.6 kg (5.75 lb)

D. Operating environment

Conforms to the operating environment of the main body.

NOTE

- **These specifications are subject to change without notice.**

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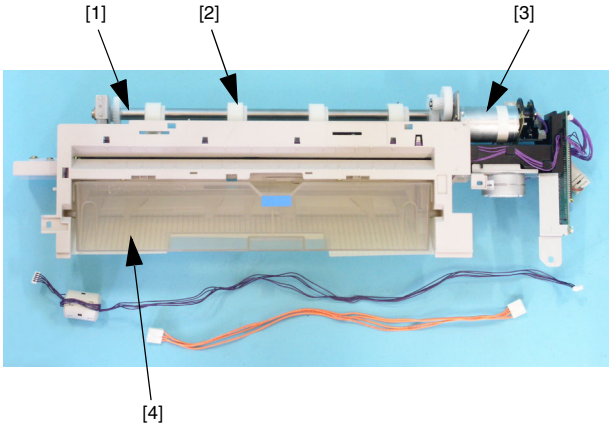
Composition/Operation

2. Overall composition



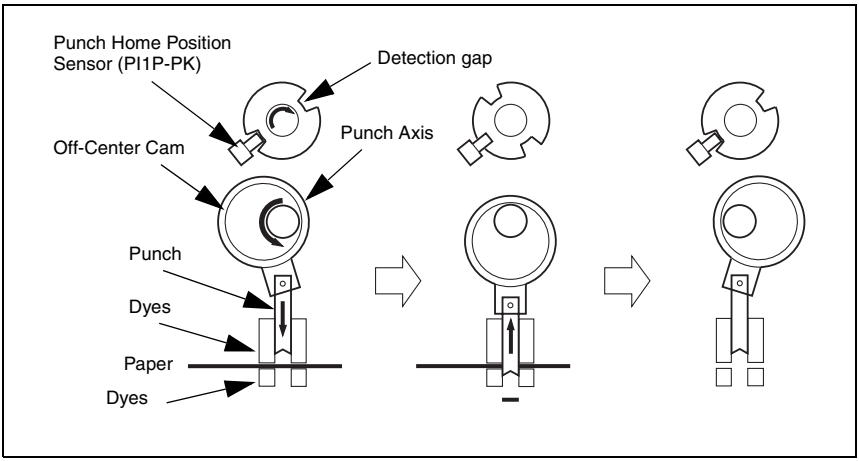
[1] Punch Axis
[2] Off-center Cam
[3] Punch Motor (M1P-PK)
[4] Hole-Punch Waste Container

3. Mechanical operations

3.1 Punching operation

- The Punch Section consists of the Dyes Section and the Punch Blade Section
- The Punch, which is attached to the Off-Center Cam of the Punch Axis, is driven by the Punch Motor and creates the punching operation with a reciprocating movement converted from the rotation movement of the Punch Axis.
- The Punching operation for the first sheet of paper completes when the Punch Home Position Sensor is switched ON from OFF after the Punch Axis turns 180 deg. in the forward direction.
- The Punching operation for the second sheet of paper is made when the Punch Axis turns 180 deg. in the reverse direction.

1. Punch Axis Stops at Home Position.
2. Punch Axis rotates by 90 deg. in forward direction and punch holes are made.
3. Punch Axis rotates by another 90 deg. in forward direction and punch operation is completed.

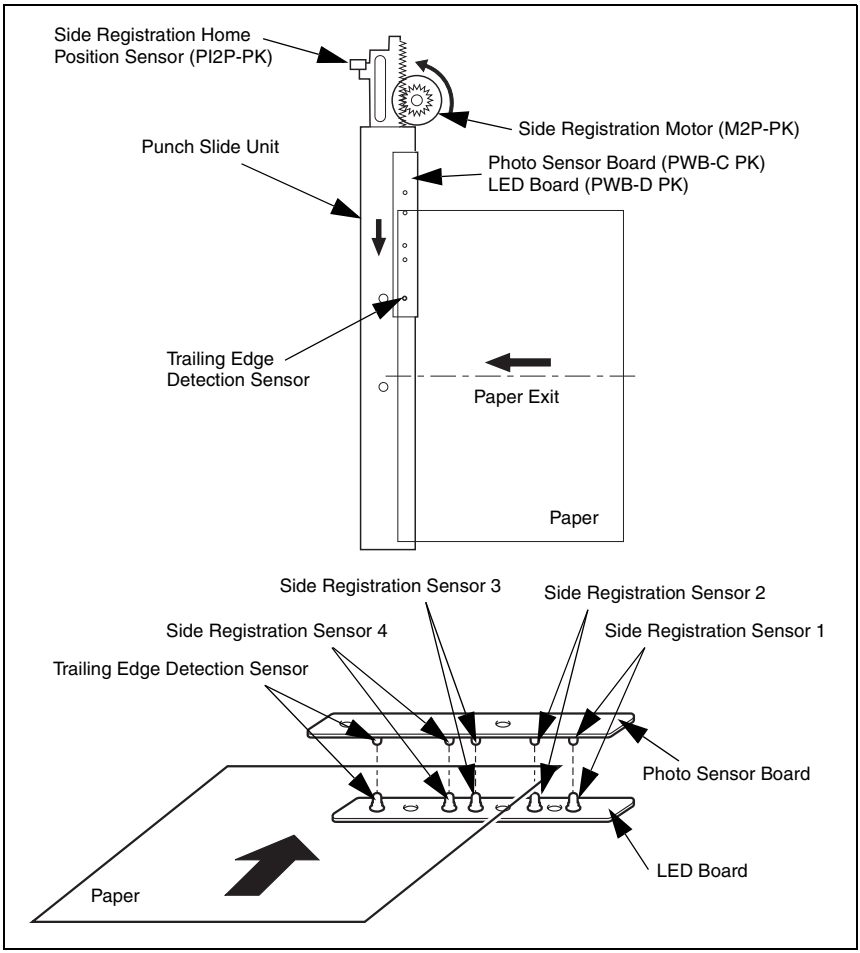


3.2 Side registration operation

- The Side registration drive for the Punch Slide Unit is made by the Side Registration Motor.
- The Home position of the Punch Slide Unit is detected with the Side Registration Home Position Sensor.
- The Punch Slide Unit detects the trailing edge of the paper with the Trailing Edge Detection and the Side Registration Sensors and then moves to the position of the trailing edge according to the size of the paper. And paper edge is detected by means the LED light emitted from LED Board and received by the Photo Sensor Board.
- Combine this and the next two slides into one transitional slide.

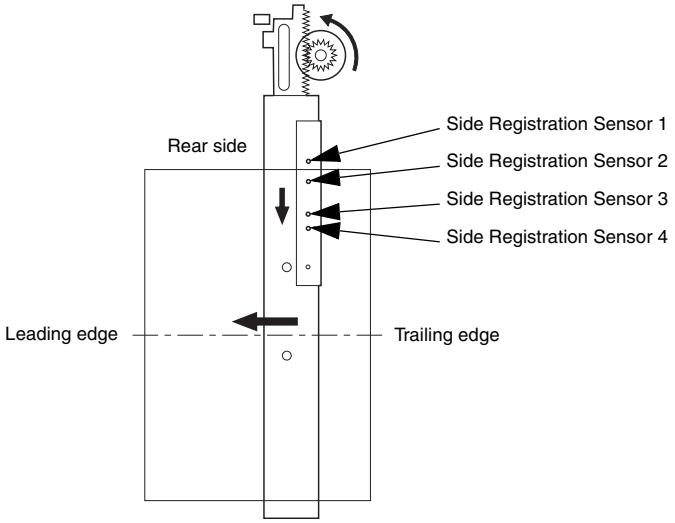
A. Operation 1

1. Trailing Edge Detection Sensor detects paper leading edge.
2. Side Registration Motor rotates.
3. Punch Slide Unit moves toward front side.



B. Operation 2

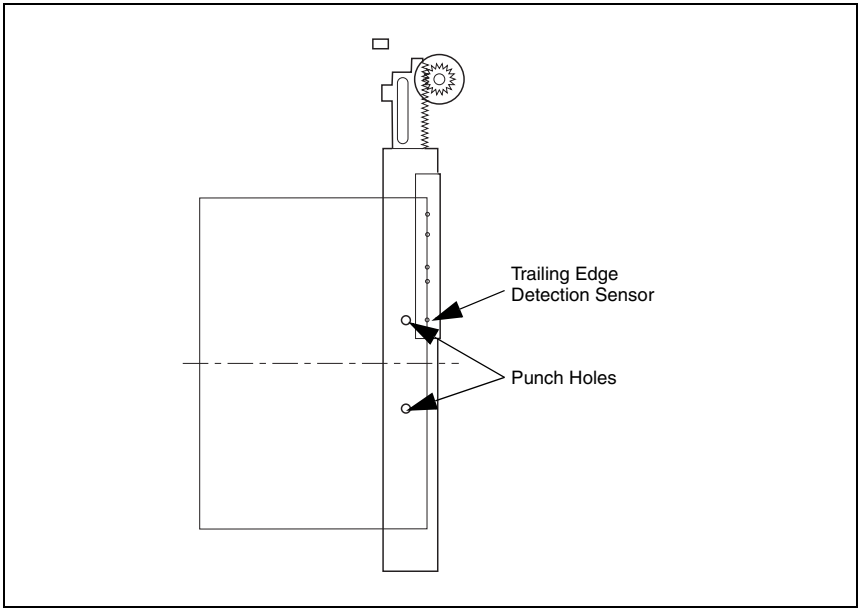
1. Side Registration Sensor detects paper edge at rear side.
2. Side Registration Motor moves Punch Slide Unit at the specified position.
3. Punch Slide Unit stops.



Name	Function
Side Registration Sensor 1	• Detects paper edge (A3, A4, 8.5×11, 11×17)
Side Registration Sensor 2	• Detects paper edge (B4, B5)
Side Registration Sensor 3	• Detects paper edge (A4S, 8.5×11S, 11×14)
Side Registration Sensor 4	• Detects paper edge (B5S)

C. Operation 3

1. Paper Trailing Edge Sensor detects paper trailing edge.
2. Transport Motor is stopped.
3. Paper transport is stopped.
4. Punch Motor is driven to punch holes.
5. Transport Motor is driven, at the same time, Side Registration Motor is driven in reverse direction.
6. Punch Slide Unit is returned to its home position.



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